LOCUS OF I-E CONTROL EXPECTANCY AND EXPECTANCY CHANGES OF DISADVANTAGED MOTHERS

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This research investigated existing internal vs external control of reinforcement expectancies (I-E Control) among indigent mothers, and changes in expectancy as a function of participating in an educational program. The two studies reported attempted 1) to validate theory and research indicating that the lower socioeconomic class individual is one who tends to perceive events as externally controlled, 2) to explore the relationship between specific maternal behaviors and I-E Control, 3) to identify individual differences within a population sample from the lower socioeconomic class on the dimension of I-E Control expectancy, 4) to examine the interrelationship between a mother's locus of control expectancy and her child's achievement in a program designed to enhance development, and 5) to extend previous research findings on correlations between internal I-E Control and participation in or affiliation with social action programs. It was predicted that participation in a social action program by lower class mothers would change their expectancies in an internal direction over time.

The subjects were indigent mothers and their infants who participated in a program designed to improve mothering skills. The program was based

on research in child development which was found to be related to the cognitive growth of children. In Study I and Study II which used better controlled procedures, families participated or were assessed over the child's first year of life.

Maternal expectancy was assessed at the beginning and end of the program by a version of Rotter's I-E Control Scale modified for a fourth grade reading level. The revision was found to be reliable over a one month interval for an indigent population. Maternal behaviors were observed and recorded weekly by parent educators, indigenous non-professionals who taught the mothers in their own homes. Infant achievement was assessed by progress on the program materials developed out of Piagetan theory and research, and two standardized tests of infant achievement.

The significant findings were:

1. Indigent mothers were more external than subjects from more advantaged populations reported by Rotter.
2. Indigent mothers were more external than indigenous non-professionals from the same background.
3. Black mothers were more external than whites in Study I but the findings were non-significant in Study II.
4. Mother's frequency of positive verbal interaction with her child was significantly related to internal control in Study I but not in Study II.
5. Mothers who participated in the program for 9 months became significantly more internal than mothers who did not participate.
6. Mothers who were taught by parent educators who designed their own program became significantly more internal than control group mothers. Mothers taught by educators who used an already designed program became more internal but the findings were not significant.

Mother's I-E Control was not significantly related to her level of negative verbal interaction, her degree of involvement in the program, her age, parity and education or her child's achievement.

The finding that participation in an educational program, particularly the one in which the teachers, former indigents themselves, designed their own program, was effective in changing indigent mothers' locus of control expectancy in an internal direction was discussed in terms of its implication for positive social action. Suggestions for future research were made on the basis of methodological and theoretical shortcomings of the studies. The possibilities of using an I-E Control measure more reliable over time, more sensitive at the internal end and more specific to the subjects' situational context were considered. Possible intervening variables between mother's expectancy and child's achievement were suggested.

CHAPTER 1 PROBLEM

The purposes of this research are to investigate locus of control expectancies among lower socioeconomic class mothers and its relationship to selected maternal behaviors and to their children's achievement; and to assess the effects of an attempt to change existing control expectancies.

Expectancy is defined by Rotter (1954) as "the probability held by an individual that a particular reinforcement will occur as a function of a specific behavior on his part in a specific situation or situations." Internal vs external control of reinforcements describes a generalized expectancy which determines to what extent certain outcomes of behavior will be categorized as within the individual's personal control and understanding. A person who generally categorizes situations as internally controlled tends to expect that it is an individual's own characteristics and skills rather than externals which influence what reinforcements he receives. On the other hand, a person who generally categorizes events as externally controlled tends to expect that chance, fate, powerful others, or an incomprehensible complexity has the greater influence over what reinforcements he receives (Rotter, Seeman, and Liverant, 1962).

Rotter (1966) summarized findings by himself and others which indicate that internal vs external control expectancy is a personality

characteristic which has predictive value in relation to other behaviors of an individual. More specifically, the findings show that an individual who tends to categorize events as internally controlled is more likely to be alert to aspects of the environment which provide useful information for future behavior, to take steps to improve his environmental conditions, and to place greater reinforcement value on acquisition of skills. Simmons (1959) also found internal control expectancy related to organizing, planning, and realistic goal-setting abilities.

Many social psychologists and sociologists have described the lower socioeconomic class individual, particularly the lower class Negro, as a person who feels powerless and alienated (Cohen and Hodges, 1963; Dean, 1961; Irelan, 1966; Reiff, 1966). A low expectancy that an individual can control his reinforcements is often referred to as powerlessness or alienation (Neal and Seeman, 1964). The empirical findings of Coleman (1966), Lefcourt and Ladwig (1965b), and Battle and Rotter (1963) corroborate this description. Thus, lower class individuals are more likely to believe in external control and lack just the personality characteristics described above which they need to improve their situation.

Other researchers have emphasized the importance of individual differences within socioeconomic classes. Bell (1965), e.g., has pointed out that different subcultures can be distinguished within the lower class continuum. One would expect to find that within,

and cutting across, subcultures there are individual differences on a behavior continuum such as internal vs external control expectancy, and that these are related to differences in other behavior.

The first purpose of this research is to investigate lower class mothers' expectancy of internal vs external control and a) the direct relationship of that expectancy to, 1) their amount and kind of verbal activity, 2) their commitment to a program designed to enhance their mothering skills and, 3) the indirect relationship between control expectancy and the intellectual development of their infants.

The second purpose is to evaluate an attempt to change those expectancies through participation in a parent education project. It is important for all people as well as disadvantaged people to become aware of the degree to which success or failure is contingent upon the acquisition of certain skills. Although it has been shown that members of social improvement groups are higher in the belief in internal control than non-members (Neal and Seeman, 1964; Strickland, 1965), the question of whether participation in such a group, e. g. the parent education project described in the next chapter, will change expectancy to a more internal direction has not been previously investigated.

It seems particularly important for lower class mothers to develop the internal expectation that their mothering abilities and the abilities they can develop in their youngsters can lead to alleviation of poverty conditions and a more successful life. According to a recent research report (Grotberg, 1969), Head Start programs were

only successful to the extent that the mothers became involved and developed a more positive attitude.

CHAPTER 2 THE PARENT EDUCATION PROJECT

The subjects for the present study came from the ongoing Parent Education Project begun in June, 1966. In this program, a small group of disadvantaged women were instructed and arranged to visit other disadvantaged homes to teach mothers to stimulate the activities of their infants. The methods of stimulation used had been shown to be related to cognitive development.

In addition to being trained to teach stimulation techniques, the parent educators were also taught to make and record observations objectively in the home. This teaching was done by means of presenting films and verbal descriptions of home situations and asking the group to judge and record these until they could all agree on various kinds of observations. In order to reduce interference with the natural environment, the parent educators were the sole observers in the home. Thus, no reliability check on their observations was possible. However, during weekly individual supervisory hours, each educator went over her observations with a supervisor. Periodically at six month intervals, visits to the homes were made by both the parent educator and her supervisor. Both made independent observations and then checked them out. There were few discrepancies.

The parent educators were 15 (12 Negroes, 3 Caucasion) high school graduates whose average family income before being hired was $280 per month for the support of an average of four people.

Thus, most of the parent educators were better off economically than the indigent population they were to work with but were still within the same socioeconomic class. All but one of the parent educators were mothers with an average of 2 to 3 children. Seven were married. Negro educators worked with Negro families; Caucasian educators with Caucasian families.

The project treatment plan is outlined in Table (Gordon, 1969). Series means weekly visits by parent educators to instruct the mother in materials developed by the project staff. Group C3 mothers were taught by another set of parent educators from backgrounds similar to those of the original parent educators. These new parent educators were former Head Start and nursery school workers who developed their own pattern of stimulation.

For all groups mothers and their infants were indentified at the birth of the latter by the obstetrics staff of the J. Hillis Miller Health Center Teaching Hospital of the University of Florida. Only families with an economic code of indigent on the hospital admission form and residence in Alachua and eleven other nearby counties were selected. In addition, the obstetrics staff used the following criteria: single birth, no breech or Caesarian delivery, no complications to mother or infant, no gross evidence of infant's mental retardation, and no evidence of mother's mental illness. These criteria were selected because of their possible relationship to normal intellectual potential. The birth rate at the hospital was such that, beginning June 15, 1966, about 30 babies a month were added to the sample through October 31, 1967 (attrition on participation in this study was about

TABLE 1

Treatment Plan for the Parent Education Project

Group (E=Experimental; C=Control)	Final N	Infants Treatment from Age 3 mo-1 year	Infants Treatment from age 1 year-2 years
Original groups began 9/15/66			
1. EI	36	Series	Series
2. E/C	36	Series	No Treatment
3. C2/C	36	No Treatment	No Treatment
New groups begun 7/1/67			
4. E2	21	Series	
5. C3	22	Stimulation Program Designed by Parent Educators	
6. C4	26	No Treatment	

30%) (Gordon, 1969).

A brief note on the use of the indigenous non-professional as reviewed in the literature is added here. Riessman (1966) and Levinson and Schiller (1965) report that the use of non-professionals from the same low socioeconomic treatment group increases communication effectiveness with the population being studied. A training program (after which the Parent Education Project's was

modeled) emphasizing interpersonal relationships, communicative skills, professional confidentiality and responsibility, continuous interaction with professionals and personal identification resulted in a high level of competence (Levinson and Schiller, 1965).

CHAPTER 3 REVIEW OF RELATED RESEARCH

I-E Control and Attempts of People to Better Their Life Conditions

A person who feels powerless to better his life conditions was described in the introduction as one who has a low expectancy that people can control their own reinforcements. Such a person, in fact, does less to improve his circumstances than one who has an internal expectancy. In experimental tests of the above assumption using Rotter's Internal vs External (I-E) Control of Reinforcements Scale (Rotter, 1966), Seeman and Evans found that the more internally controlled TB patients knew more about their own condition, questioned the doctors and nurses more, expressed less satisfaction with information feedback, and were rated as better patients by the staff; Seeman (1963) found independent of intelligence (correlation of Beta I.Q. with I-E scale was .03) that the more internally controlled reformatory inmates knew more about how the reformatory was run, parole, and pertinent information about economic opportunities for post-reformatory living. Kiehlbauch (1968) found that prisoners who attained a work release status, i.e. were allowed to work in the community towards the end of their incarceration, did not show the rise in externality one month prior to release that a matched sample of prisoners did. Gore and Rotter (1963) found willingness to make a commitment to social action on civil rights was related to internal control among a group of Negroes enrolled in a southern college,

and Strickland (1965) extended the latter finding to actual participation in social action. Students actively involved in the civil rights movement were more internal than a matched control group of non-participants. Male smokers who quit after the Surgeon General's report were found to be more internal than those who believed the report but did not quit smoking (James, Woodruff, and Werner, 1965).

The predictions in this study are that mothers using more mothering skills, more specifically verbal interaction, would be more internal, and that those who saw the project in a positive light and cooperated would also be more internal.

I-E Control and Learning

Rotter's (1966) "... basic hypothesis is that if a person perceives a reinforcement as contingent upon his own behavior, then the occurrence of either a positive or negative reinforcement will strengthen or weaken potential for that behavior to recur in the same or similar situation" (page 5). In a series of studies which contrasted learning under experimentally defined conditions of chance and skill, subjects made more appropriate responses to positive and negative reinforcements(increase in positively reinforced behaviors, decrease in negatively reinforced ones), generalized their learning to a significantly greater degree, and were more resistant to extinction under skill conditions than under chance conditions (Phares, 1957; James, 1957; James and Rotter, 1958; Rotter, Liverant, and Crowne, 1961).

A few studies have contrasted individuals who tended to see events as skill controlled vs those that saw them as chance controlled. Phares (1957), using the first precursor of the I-E Control Scale, found a tendency for subjects scoring higher on in-

ternality to give more appropriate responses to reinforcement. These findings approached significance. Using the James-Phares Scale from which the I-E Scale is derived, James (1957) found significant relationships between internality and all three learning variables mentioned above. Thus, the greater tendency an individual has to perceive situations as internal, the more he will learn from that situation; the more he will generalize that learning to related situations and the more he will remember over time. Coleman (1966) surveyed students and school conditions in all twelve grades across the country. They found that differences in school conditions such as facilities, curriculum, teaching quality and availability were insufficient to explain differences in verbal and non-verbal ability, reading comprehension, mathematical achievement, and general information about the natural sciences, social studies, humanities, and practical arts as assessed by comprehensive tests administered through the local schools. On the other hand, they report that a Negro child's achievement is highly correlated with his feeling that he can control his own destiny.

There is also evidence that need for achievement is related to I-E Control. In a study using the Intellectual Achievement Responsibility Scale, Crandall (1962) found that for boys in the first three grades, achievement motivation as measured by free play achievement behavior and achievement test scores was related to more internal scores. The findings did not hold for girls. Franklin (1963) found 15 of 17 kinds of reported evidences of achievement motivation correlated with scores on the I-E Scale in a national stratified sample of 1,000 high school students. Using latency of

decision on a matching task as a measure of achievement motivation, Rotter and Mulry (1965) found that when unselected subjects were divided at the median I-E score into internals and externals, the former showed greater need for achievement. In summary, I-E Control is related to amount, generalizability, durability of learning, and need for achievement. Applying this logic to the present study, mothers who learn more and use this increased knowledge on their children should be more internal.

Personality Correlates of I-E Control

Although a more precise relationship between exact score on the I-E Scale and specific personality attributes has not been validated, Rotter (1966) suggests that the extremes may be related to adjustment problems. That is, an extremely high external score may be an indication of defense against failure while an extremely low one may be associated with the assumption of an unrealistically high amount of responsibility and consequent guilt for personal actions. Effran's 1963 study of high school students indicated a relationship between the tendency to repress failures versus successes, and scores towards the internal end of the dimension. This was interpreted as an indication that internals feel a greater need to defend against failure while externals already have a convenient rationalization (Rotter, 1966). Butterfield's study (in Lefcourt, 1966) indicated that internals depict themselves as goal directed workers who strive to overcome hardships while externals portray themselves as suffering, anxious, and less concerned with achievement than with their emotional response to failure.

Rotter (1966) reports that studies examining relationships between measures of adjustment and the I-E scale are suggestive but inconclusive. Rotter and Rafferty (in Rotter, 1966) compared the scale with the Rotter Incomplete Sentences Blank (ISB) for several samples of college students. Generally linear correlations were insignificant. Some curvilinear relationship between extreme scores on the I-E Scale and maladjustment scores on the Rotter ISB approached significance. The extreme scores were less well adjusted. Simmons (1959) similarly found a positive but nonsignificant correlation ratio (eta) between the two measures. He also found no reliable correlation between the Rotter ISB dependency score and the I-E Scale for college males. Kiehlbauch (1968) reports good vs poor adjustment groups of prisoners did not differ on I-E scores.

Ware (Rotter, 1966) found a significant correlation of .24 between externality and the Taylor Manifest anxiety scale. Effran, using the same measures, found a correlation of .00 (Rotter, 1966). Cromwell, Rosenthal, Shakow and Kahn found schizophrenics higher in externality than normals (Lefcourt, 1966). Overall, the results suggest some relationship between extreme scores and maladjustment with perhaps greater variance coming from the external extreme. In test behavior internals seem to have a more constructive response to failure.

Several studies (James, 1957; Battle and Rotter, 1963; and Simmons, 1959) have found the goal setting of externals more variable and unrealistic. The external subjects are more prone to the gambler's fallacy of expecting to win after a series of failures in skill situations. Simmons (1959) furthermore found externality

correlated positively with other maladaptive goal setting patterns, and negatively with Edwards Personal Preference Schedule needs for order, nurturance and endurance for college women. He concluded that external females are more disorganized, lack planning and realistic goal setting abilities and are fatalistic compared to internal females. Several studies have found relationships between I-E Control and self-reliance. Julian and Katz (1968) found on a competitive task that internal college students preferred to rely on their own resources rather than those of their opponent even though they were shown by experimental manipulation that their opponent was more competent. Odell reported a significant relationship between I-E Control and Barron's independence of judgement scale. Crowne and Liverant found externals conform significantly more in an Ashe type conformity situation (Lefcourt, 1966). Deever (1967) reports internals choose their personal reinforcement history rather than reported performance of others as an index or cue to expectancy of personal success in the future.

In the present study successful participation depended upon the mother's active use of what she learned in the parent educator's absence. This would seem to be related to her self-reliance and organization. Thus, it was predicted that a volunteer mother's success both in terms of her performance as a teacher of her child and the child's success would be related to I-E Control.

I-E Control and Affiliation

Neal and Seeman (1964), using the I-E Control Scale, found that members of a work based organization were significantly lower in

externality than controls (matched for age, socioeconomic level and education) who were non-members. Furthermore, activity within the union and general knowledge of political events were positively related to internality. Differences were not related to generalized despair scores as measured by Srole's Anomia Scale. The authors concluded that internality was related to affiliation with an organization that can better one's life circumstances. The direction of influence was not assessed. Either more internal people affiliate, or affiliation engenders internality. The present study proposed to test the assumption that affiliation modifies expectancy in an internal direction.

Expectancy and Demographic Variables

The population for this study was selected from volunteers in the Parent Education Project. Since they were lower socioeconomic class mothers (6:1 ratio of blacks to whites), the primary concern here was the relationship between expectancy and class and expectancy and race.

Race

Several studies have found that Negroes are significantly more external in their control expectancies than Caucasians. Lefcourt and Ladwig (1965b) and Battle (1962) using the I-E Scale found a small (a score of 9 compared to 8 out of a possible total score of 23) but significant difference. Coleman (1966) found that in a country-wide sample of school children a significantly higher proportion of black than white children answered three questions about control expectancy in an external direction. Lefcourt (1966)

argues that blacks easily perceive impediments in the way of goal striving. Segregation and discrimination are interpreted as meaning that their own effort will not pay off in reinforcements. On the other hand, Kiehlbauch (1968) found a small difference in the same direction between black and white prisoners in their I-E scores which did not reach a significant probability level. Thus, every one of these four studies comparing black and white subjects has found blacks to be more external than whites. The results in only one study were not significant. If Lefcourt's argument is correct, and it seems to hold up country-wide in Coleman's study, it should hold in a southern community. Consequently, it was predicted that Negro mothers would be more external than Caucasian mothers within this disadvantaged population.

Socioeconomic Level

For populations in which social class differences are small no relationships between class and I-E Control have been found. That is, there were no differences in I-E Scale scores by social class in Ohio State University classes (Rotter, 1966), Florida A & M classes (Gore and Rotter, 1963), or in a sample of prisoners (Lefcourt and Ladwig, 1965b). Since subjects in the present study were from a relatively homogeneous social class, differences in I-E Scale scores by socioeconomic level could not be examined. Differences have been found in populations more heterogeneous for socioeconomic class. Persons in the lower class tend to score more at the external end of the I-E Scale. One study of children (Battle and Rotter, 1963) found a significant difference between social classes with race and intelligence controlled. Most of the

variance was accounted for by the difference between lower class Negroes and middle class Negroes and whites. Dean (1961) found low (.10 to .23) but significant correlations between alienation and level occupation and income. His questionnaire included components of powerlessness, normlessness (lack of rules), and social introversion. The prediction here is that the present sample of lower class subjects will be more external than samples stratified by social class.

Intelligence

Correlations of externality or powerlessness with intelligence are generally low and insignificant but there are exceptions. Strickland found no correlation between I.Q. and I-E scores with a sample of Ohio State coeds. Seeman (1963) found no significant correlation between prison inmates Beta I.Q. scores and I-E scores. In the Kiehlbauch (1968) study there was no significant correlation between I-E and I.Q. scores. On the other hand, Ohio State University womens' external scores on the I-E dimension were found by Cardi (Rotter, 1966) to be correlated -.22, and by Simmons (1959) -.47 with intelligence. Since the balance of evidence is for no correlation between I.Q. and I-F Control, the present study did not examine this relationship.

Education

Evidence for the relationship between education and I-E Control expectancy is equivocal. Rotter (1966) reports unselected high school students score higher (more external) on the I-E Scale than college bound students. Dean (1961) found a low but significant inverse correlation between alienation and educational level. On the other hand, in the studies Rotter (1966) summarized the scores

of college students are generally not different from prison inmates with an eighth grade reading level. The present study predicted that since the educational level would probably be relatively homogeneous, there would not be any significant relationship between educational level and perceived locus of control.

Age

Age differences have not been found to relate to differences in control expectancy. Although the present sample includes very young (15 years old) and older (76 years old) mothers or mothering ones (see subjects, p. 21) the prediction is for no correlation between age and expectancy.

Effects of Mother-Child Interaction

I-E Control, Mothering, and Infant Cognitive Development

It is assumed here that a mother's expectancies and behaviors will be interrelated with her child's cognitive development. A mother internal in orientation, according to the foregoing research discussed, should take steps to improve her mothering skills. Such improvement is expected to show up in increased cognitive development of her child. The focus here will be on verbal behavior. Conversely, if a child is successful cognitively, thus confirming his mother's ability, his mother's expectancy should change in an internal direction.

That maternal behaviors are a significant influence on a child's cognitive development is well known. Maternal aspirations and expectations, reward and punishment of her child's behavior, provision of materials and other opportunities to stimulate the child's

development and policies for rearing of the child have all been found in the child development literature to be related to the cognitive development of the pre-school child (Gray and Miller, 1966). These are particularly crucial in disadvantaged homes where, for example, Bayley (1966) suggests there is a lack of stimulation which may be causative of retardation. The lack of verbal stimulation has particularly been emphasized. Hunt (1966) points out that verbal stimulation is lacking in disadvantaged homes during the first two years of an infant's life. Bernstein (1961) points up the long range implications of this. He find that lower class members experience a relatively narrow range of variations in language. Thus, they come to rely on highly predictable implicit utterances which poorly equip them to express themselves. The inflexibility of their verbal expression interferes with their ability to become actively responsible for their own behavior or learning.

The child influences the mother as well. For example, a child's executive competence has been found to influence the mother's emotional reactivity (Wenar and Wenar, 1964). In the present study a child's success is predicted to lead to his mother's movement in an internal direction analogous to the subjects in the studies of Rotter, Liverant and Crowne, Bennion, and Blackman (Rotter, 1966) who were likely to see a sequence of reinforcement as skill controlled (internal) when reinforced as right more than 50% of the time. A child's success in the project is assumed to be reinforcing to the mother.

Love Oriented vs Power Assertive Discipline

A more internal mother is expected to perceive the reinforcements her child gets as contingent upon his characteristics or actions. She would seem more likely, then, to use discipline which engenders the development of internal standards. In a review of the literature on parental discipline, Becker (1964) refers to love oriented techniques such as reasoning with and praising the child. These are reflected in the positive verbal interaction index used in this study by items such as: "Mother explains and describes things when talking to the baby"; "listens to the baby when the baby talks"; "her tone of voice sounds soft and loving."

On the other hand, a more external mother perceives reinforcements that happen to an individual to be contingent upon chance, fate, incomprehensible complexity or the actions or characteristics of more powerful others. Thus, she would seem to be more likely to use discipline techniques which lead to externalized reactions to behaviors (e.g. fear of punishment, projected hostility). These techniques classified as power assertive would seem represented by the items in the negative verbal interaction index such as "Mother orders or tells the baby to do or not to do things"; "her tone of voice sounds cross and angry."

The consensus of research is that love oriented techniques, most reliably reasoning and praise, have been found to be correlated with the occurrence of internalized reactions to transgressions in the form of acceptance of self-responsibility, while power assertive techniques correlate with externalized reactions (Becker, 1964).

More specifically, Tolor and Jalowiec (1968) found that college students who perceived maternal attitudes of authoritarian control and hostility rejection as assessed by the Parent Attitude Research Inventory (PARI) were more external on the I-E Scale than those perceiving democratic attitudes. The foregoing studies deal with parent behaviors influencing child's control expectancy. The present study deals with the relationship between a mother's behaviors and her own control expectancy.

In summary, for the women in this study, the maternal role was considered a significant focus of the life situation. Therefore, motivation for self-improvement was assumed to include a desire to enhance the performance of the maternal role. Furthermore, it was assumed that the opportunity to participate in the Parent Education Project was an opportunity to improve the performance of the maternal role. At least this is the way the parent educators perceived it when introduced to the program. It is also consistent with their informal descriptions of how most of the volunteer mothers perceived the program (Gordon, 1969). Thus, a mother's degree of participation and involvement in the project (as assessed by such behaviors as: demonstrating ability to perform the skills taught, encouraging her child, keeping appointments with the parent educators) were considered a manifestation of attempts to improve her life situation. One important reflection of this improvement was assumed to be the child's success in the project program. Thus, it was predicted that differences in the amount and quality of maternal care, particularly verbal behavior and attitude toward the project, would be related to I-E control and

that this in turn would be interrelated with the cognitive development of her infant.

CHAPTER 4 STUDY I: HYPOTHESES

The Parent Education Project described in Chapter 2 began as a pilot study. Thus, the usual difficulties encountered in naturalistic research were added to by such problems as the inexperience of the parent educators and changing plans as to the most appropriate or expedient time to collect a particular datum. Some of these problems were ironed out by the time three new groups of subjects began participating in the project one year later. These new groups were used for a second study which was planned to investigate the same issues as Study I. The hypotheses for the first study are listed below.

Hypotheses

Class, Race, Age, Parity

1. The present sample of lower class mothers will be more external in I-E Control than previously studied samples that were not restricted to the lower class.

2. Black mothers will be more external than white mothers.

3. There will be no significant correlation between age or parity of the mother and I-E Control.

Maternal Verbal Interaction Level

4. a) Mothers higher in positive verbal interaction with their child initially will be more internal in I-E Control than mothers lower in positive verbal interaction.

b) Mothers higher in positive verbal interaction with their child will become more internal in I-E Control over a 15 month interval than mothers lower in positive verbal interaction.

5. a) Mothers higher in negative verbal interaction initially will be more external in I-E Control than mothers lower in negative verbal interaction.

b) Mothers higher in negative verbal interaction will become more external in I-E Control over a 15 month interval than mothers lower in negative verbal interaction.

6. Mother's educational level, individually or in interaction with verbal interaction, will not be related significantly to I-E Control.

Infant Cognitive Development

7. There will be a significant two way relationship between mother's I-E Control and her child's cognitive development such that:

a) Children of mothers more internal in I-E Control will learn more and be more highly developed by the end of their second year of life than those of mothers more external in I-E Control.

b) Mothers of children who are more highly developed cognitively will be more internal in I-E Control than mothers of less well developed children.

c) These mothers will also become more internal over a 15 month interval.

Effects of Participation

8. Mothers who participate longer (21 months) in a program to improve their mothering skills will become more internal in I-E Control than those who participate for a shorter period of time (9 months).

9. a) Mothers who make better use of the program as manifested in such behaviors as keeping appointments and mastering materials will be more internal in I-E Control initially than mothers less involved.

b) Mothers who make better use of the program will become more internal in I-E Control over a 15 month interval than mothers less involved.

CHAPTER 5 STUDY I: METHODS

Subjects

The subjects have been described under Parent Education Project in Chapter 2. They are in treatment groups 1-3 (see page 7). Thus, data on mothers and their children cover from the third to the twenty fourth month of the children's lives. For this study only mothers or mother substitutes (e.g. grandmother) who had the major responsibility for the child's care were selected. The number of subjects for the different variables changes somewhat because of missing data.

Design

The major variable studied, I-E Control, was the score attained by the mother on a modified version (SRI) of Rotter's I-E Scale (see Instruments). All of the mothers studied were given the SRI when their babies were 6 months old. This was considered the initial or pre SRI score. Mothers were retested when their babies were 21 months old. This was considered the final or post SRI score. The difference between the post and pre SRI scores was called the SRI change score. Except for the hypothesis in which infant achievement was the dependent variable, the SRI score was the dependent variable. To allow for initial differences and changes, generally the relationships between the independent variable and all three SRI scores (pre, post and change) were examined.

The treatment plan to test the effect of participating in a program to improve mothering skills on a mother's I-E Control is charted on

page 5, Chapter 2. The group 1 mothers participated for 21 months compared to 9 months only for group 2 and no participation for group 3. Insufficient data were available on group 3. This precluded assessing the effects of participation vs non-participation. Instead, the effect on I-E Control of the length of participation was tested by a t test of the difference between the mothers' expectancy scores of group 1 and group 2.

Mothers' verbal interaction levels (positive and negative) and mothers' degree of involvement in a program to improve mothering skills were rated by the parent educator in weekly observations (see PEWR in Instrument section) over a 21 month period for treatment group 1 and over a 9 month period for treatment group 2. In assessing the relationship between positive or negative verbal interaction level and I-E Control, first mothers were grouped as high or low on verbal level. Then they were split at the median on educational level. The hypotheses were then tested by a two way analysis of variance of the SRI scores.

In order to test the relationship between mothers' degree of involvement in the program and mothers I-E Control, first mothers were grouped as high or low in involvement. Then they were split again according to whether they were high or low in positive verbal interaction. This hypothesis was also tested by a two way analysis of variance.

The inter-relationship between mothers' I-E Control and infant cognitive development was tested with the "short term prospective model" (Wenar and Wenar, 1964). This model allows for consideration of the direction of influence in studies of parent-child interaction. Families were classified in two ways, i.e. for I-E control and infant

intelligence. Families were divided into high and low on the basis of mother's initial external score and then, again, on the basis of the child's initial intelligence rating as high or low. Then the data were set up twice, once for intelligence change scores and once for expectancy change scores. When the child's cognitive progress is the dependent variable, significant differences would be attributed to the child's intellectual development. When changes in mother's external scores are plugged into the same design then significant differences are attributable to maternal expectancy.

The hypothesis concerning I-E Control and socioeconomic class was assessed by a t test of the differences between the I-E scores of the present subjects and scores of subjects from more advantaged populations. The relationship between race and I-E Control was examined by testing differences in SRI scores between black and white subjects. Age, parity and I-E Control scores were correlated to assess whether they were significantly related.

Non Standardized Instruments

Rotter's Internal vs External Control of Reinforcements Scale

This instrument was designed to assess the extent to which an individual categorized events as internally or externally controlled. It is a 29 item forced choice test which includes six filler items and is entitled "Social Reaction Inventory" to make the purpose of the test somewhat ambiguous.

The test appears to be internally consistent, reliable, unidimensional, and has good discriminant and external validity. The item biserial correlations for a sample of 400 men and women range from .11 to .48 with 13 out of 23 items greater than .25. The split

reliability ranges from .69 to .73. This is below desirability. However, the items are additive rather than equivalent. Rotter (1966) reports one month test-retest reliabilities in the .70's. Kiehlbauch's study (1968) showed a three month reliability of .75. With 6 and 9 month intervals the coefficients are nonsignificant: .39 and .16 respectively. Factor analysis revealed that a general factor accounted for 53% of the variance with the rest being accounted for by several factors of a few items and a small degree of variance each. Correlations with the Marlowe-Crowne Social Desirability Scale range from -.35 to -.07 when administered by authority figures in various institutions. The highest correlation can be explained by the fact that the test was administered with a battery of classification tests given to new prison inmates (Rotter, 1966). Low correlations with intelligence and tests of external validity have been described in the literature review.

Modification of Rotter's I-E Scale for Below an Eighth Grade Reading Level (SRI)

The I-E Scale has previously been found satisfactory for people with at least an eighth grade reading ability. Since it was suspected that many indigent mothers in the project might not meet this criterion, an attempt was made to adapt the test for this population. The parent educators took the original test. Afterwards, they were asked to pick out words and phrases they thought their poorest reading volunteer mother might not understand. They were asked to rephrase these in terms they would use in expressing themselves to these mothers. The revisions were then collated and edited for correct grammar and consistency of meaning with the original version. The final revision was

edited for words inappropriate for higher than third grade reading according to the Thorndike-Lorge (1944) word list. In a few cases fourth grade words had to be included. A test-retest reliability coefficient of .78 and with an of 35 was obtained for a two week interval on a population comparable to the subjects of this study (Freijo, Gordon, and Bilker, 1968).

The above revision followed an attempt to adapt Bialer's (1961) Children's Locus of Control Scale. The wording of the latter was modified slightly to make it appropriate for adults (e.g., in "Do you think a kid can be whatever he wants to be," woman was substituted for kid and she for he). Then, this modified scale was given to the 15 parent educators. It correlated -.20 with the I-E Scale and so was abandoned.

It was thought further that the administration of the scale might present other problems such as those encountered by Radin and Glasser (1965) in their use of the PARI with disadvantaged mothers. In addition to language complexity, they found that interruptions in the home, reluctance to disclose information to a person of a different background and insufficient rapport with the examiner to tell if the subjects understood were problems. Although many of these problems are mitigated by the use of indigenous workers, in anticipation of any that might remain, the parent educators were instructed to read the items to each mother while the mother made her choices on her own copy, to make it clear that there were no right or wrong answers and that their responses were confidential, and to pause for interruptions and even return another day if circumstances seemed to be influencing a volunteer's state of mind. Thus, the administration of the I-E

Scale used here eliminated language complexity and word connotation differences between backgrounds, facilitated the good rapport, and allowed the subjects to take the scale under natural conditions.

The Parent Educator Weekly Report and Derived Behavior Indices

As was described earlier, each mother was visited once a week by the same parent educator. The mother had stimulation materials presented to her and did the previous week's activities with the baby for the parent educator's evaluation. The parent educator made an appointment for the next visit before she left. Immediately after leaving the home, the parent educator filled out an observation report, the PEWR (see Appendix B).

The PEWR (Parent Educator Weekly Report) is an omnibus form prepared by the project staff (composed of educators, psychologists and nurses) to include data on home conditions presumed to be relevant to the learning of the baby and the mother. It includes suggestions from Rheingold (1960) and Stedman.* Inter-observer agreement between supervisor and parent educator on bi-annual visits was high. A formal reliability test of repeated observations was not done in order to minimize the presence of the professional staff in the home. It was felt that the presence of an unfamiliar authority figure would interfere with the observations of natural home conditions and interfere with the rapport between a mother and her parent educator. Items from the PEWR were organized into three indices: the index of Positive Verbal Interaction (VI+); the index of negative verbal interaction (VI-); and the index of attitude toward Parent Education Project (PEP). The items which are additive rather than of equal weight

*Dr. Donald J. Stedman, Duke University, personal communication, 1966

were chosen on a face validity basis. E.g., a typical item for the VI+ index (in the mother column since the subjects for this study were mother or mothering one's) was "Tone of voice sounds soft and loving." A sample VI- item was "In a few words, order or tell the baby to do or not to do things." An illustrative item of the PEP index scored positive was "How did the mothering one react to your instructions?" 1. "Looked at you while you were talking, and/or asked questions." A sample item scored negative was "When you finally got to see the mothering one: 1. She said nothing about missing her appointment."

After the Parent Education Project was well under way a validity check was made on the index of positive attitude toward the project (PEP). The parent educators were asked to rank each of their volunteer mothers on positive attitude toward the project. The mothers were then ranked independently according to the PEP index. The ranks for the index correlated better than .80 with the parent educator's ranks according to Gordon.* (Appendix B lists the specific items and manner of scoring for each index.)

Further validity tests are provided in studies by Gordon (1969) and Gordon, Herman, and Jester (1968). Gordon found mothers' VI+ index positively related to their children's achievement. Gordon et al. found a reliable difference between achievement of children of mothers whose attitudes were rated positive compared to those not so positive on the PEP index.

Stimulation Series Test

The stimulation series, samples of which appear in Appendix C,

*personal communication, 1970

was designed by the project staff to provide infants with the kind of experience through which, according to Piagetan principles, adaptation through accommodation will lead to greater modification of development and greater cognitive organization than would otherwise be expected from growing up in a culturally deprived environment (Gordon, 1969). Sigel (1964) points out the possibility that adequate stimulation in the first two years of life may be necessary for a rate of intellectual development which will allow for acquisition of necessary knowledge later on. He suggests that one reason why children from disadvantaged homes have difficulty in kindergarten and first grade is that there was a stimulation decrement in the first two years.

The assessment of progress on the series was carried out by the five staff members who taught the material to the parent educators. Parent educators and their caseloads were randomly assigned to each supervisor. Thus individual differences in scoring of the series were randomly distributed with respect to other variables in this study.

Although the series test is not independent of participation in the program, the use of it does not violate any assumptions inherent in the hypotheses of this study. Each of the children being compared has an equal opportunity to progress on the material.

The derivation of the series is not the main focus of the present study and will be sketched briefly here. The reader is referred to Gordon (1969). The exercises were chosen for ease of teaching and evaluating. They were derived from Uzgiris and Hunt, 1966; Bayley (1933), Gesell (1949), and Cattell norms (1947); Hess et al. (1965); and Bernstein, 1960 (in Gordon, 1969). The materials are organized

so that they were introduced to the infant before the behavior should occur, according to the aforementioned norms and studies. Order of presentation also took developmental norms for position into account so that, for example, the first set of exercises have the baby prone or supine, while a later set has him creeping (Gordon, 1969).

Standardized Instruments

Griffiths Mental Development Scale

The test was developed by the author (Griffiths, 1954) to measure mental development during the first 2 years of life. The scale consists of 260 items selected from a larger pool of items from other infant scales after extensive pretesting and observation of infants. On the basis of pretesting of infants the items were also grouped into five subscales and arranged in order of increasing difficulty. There are an equal number of items in each of the five subscales for each age period. The subscales are: Locomotor, Personal-Social, Hearing and Speech, Eye and Hand, and Performance.

The scale was standardized on 571 British children largely from infant welfare clinics and day nurseries. Like the Stanford-Binet, this test is an age scale. Three items passed represents one week of credit in the first year. Two items passed counts as one week of credit in the second year. The mean general quotient (GQ) for the standardization sample was 99.7 with a standard deviation of 12.1.

The retest reliability coefficient over an interval of an average of 30 weeks (a range of from 7 to 70 weeks) on 60 cases was .87. Correlations with Stanford-Binet IQ's at age 5 were higher than those reported for other infant tests. The Griffiths GQ at 6 months correlated .32 with the Binet IQ at age 5. At 18 months the GQ correlated .40 with the Binet IQ at age 5.

To insure adequate familiarity of the examiner with the test, the author permits testing materials to be sold only to persons who have been trained by her in their use (Griffiths, 1954).

Bayley Mental Development Scale

This test was designed to measure developmental progress from birth to two and one half years (Bayley, 1969). The Mental Development Scale was designed to assess early learning, problem solving, communication and abstract thinking capacities. The items (163) were derrived mainly from the California Preschool Mental Scale and the California First Year Mental Scale. The items were selected on the basis of data on 1560 children.

The standardization sample consisted of 1,262 children from 2 to 30 months old. The sample was selected to represent the U.S. population (1960 census) within this age range. The age placement of items was the age at which 50% of the children passed a given item. The mean standard score of the scale (called the Mental Development Index) was 100 with a standard deviation of 16. The split half reliability coefficients ranged from .81 to .93 with a median of .88. The mean percentage of retest agreement over a one week interval was 76.4 (S.D. = 13.7). The Mental Development Index (MDI) and Stanford-Binet (Form L-M) IQ were found to correlate .57 (Bayley, 1969).

Data Collection

The parent educator weekly report observations were filled out for every home visit beginning when each baby was three months old. Thus, if there were no missed visits, there would be 13 reports by the time the baby was 6 months old. The I-E Scale (Social Reaction Inventory)

was administered by the parent educator when each mother's baby was 6 months old and again at 21 months. Staff members administered the Series Test at 6, 12, 18 and 24 months of the baby's age, the Griffith's Mental Development Scale at age one, and the Bayley Mental Development Scale at age two.

CHAPTER 6 STUDY I: RESULTS AND DISCUSSION

Class, Race, Age and Parity

Hypothesis 1 was that the present sample of disadvantaged mothers would be more external than previously studied samples not restricted to the lower class. Table 2 shows a comparison of the external scores of the indigent mothers in the project when their infants were 6 months old with the scores of two samples presented by Rotter (1966) and those of a group of women from lower class backgrounds chosen for Project Follow Through which was modeled after Project Head Start.

Hypothesis 1 is confirmed. Southern, indigent mothers, mostly black (13:1), were significantly more external than samples of people from all socioeconomic levels. This confirms Battle and Rotter's (1963) finding of the relationship between class and control expectancy and extends the findings to adults. It also confirms Dean's (1961) results of correlations between scores on a scale of powerlessness, and low socioeconomic level. It is interesting to note that the Project Follow Through educators, most of whom came from the ghetto area, were significantly less external than the project mothers. While this may reflect the influence of being chosen for a relatively high status job, it may also be an indication of different sub-cultures within the lower class. As will be seen in the next section,

education was not a significant variable. The Project Follow Through educators obviously were alert to information relevant to their life situation and took steps to improve their life situation in securing the job. Thus, this finding may be taken as consistent with the studies presented in the literature review indicating persons who know more about their surroundings and make commitments to social action are more internal in orientation.

Hypothesis 2 was that black mothers would be more external than whites. The mean SRI score after 21 months of participation for 11 white mothers in the project (Groups 1-3) was 7.18 with a standard deviation of 3.63. The mean for 54 black volunteers was 10.25 with a standard deviation of 3.54. The difference of 3.07 yielded a t of 5.18 significant at less than .001. Thus, hypothesis 2 is confirmed. As suggested by previous research and theory, lower class members are less likely to see reinforcements as contingent upon an individual's skills and characteristics than the population at large. Furthermore, within our lower class sample, the perception of an individual as powerless or externally controlled was more extreme among black than white subjects.

Hypothesis 3 predicted no significant relationships between age or parity of mothers and their I-E scores. Table 3 shows the correlations between age, parity, and I-E Control after 3 (pre) and 15 (post) months project participation and the difference between the two scores (change).

Since an r greater than 0.37 would be necessary for significant results at the .05 level, there is no reliable relationship between maternal age or parity and I-E Control. Hypothesis 3 is confirmed.

Table 2

A Comparison of Three Populations With Subjects in Groups 1 and 2 in the Present Study on I-E Control

Sample	Scale Used	Sex	N	$\bar{X}$	S.D.	t
Prisoners, 18-26, 8th grade reading (Ladwig, 1963)	I-E	M	80	7.72	3.65	5.49*
National Stratified Sample 10th, 11th, 12th grades (Franklin, 1963)	I-E	M&F	1,000	8.50	3.74	5.28*
Follow Through Parent Educators (Gordon, 1969)	SRI	F	40	7.21	3.58	5.43*
Parent Education Project Mothers-groups 1 & 2	SRI	F	42	11.50	3.14	

*Significant at p less than .0001.

Table 3

Correlations Between Age and Parity and Initial (pre), Final (post), & Changes in I-E Control Scores for 32 Subjects

	SRI		
Variable	Pre ($\bar{X}$=11.50 S.D.=3.14)	Post ($\bar{X}$=11.0 S.D.=3.14)	Change ($\bar{X}$=0.50 S.D.=3.88)
Age ($\bar{X}$=25.94, S.D.=11.10)	+0.27	+0.32	-0.02
Parity ($\bar{X}$=3.41, S.D.=2.20)	+0.18	+0.31	-0.02

Maternal Behaviors and Attitudes

Positive Verbal Interaction (VI+)

Mothers were grouped as either high or low depending on whether their positive verbal interaction index, calculated to summarize 21 months of visits by a parent educator, fell above or below the median index of all mothers. Then they were split at the median again according to education. SRI (Modified I-E Control Scale) scores were then analyzed again at an initial point and near the end of the project. Change scores were also analyzed.

Hypothesis 4a predicted that mothers higher in positive verbal interaction would have a more internal control expectancy. Hypothesis 4b predicted these same mothers would become more internal by the end of a 15 month interval. Tables 4.1 through 4.4 summarize the mean I-E scores (SRI) of subjects grouped by positive verbal interaction and education. Tables 5.1, 5.2, and 5.3 show the analyses of variance of I-E scores at the beginning (pre), and the end (post) of the project and the change in I-E scores over the 15 month interval.

While there is no significant relationship between positive verbal interaction and initial locus of control, mothers with a higher level of verbal interaction are more internal in orientation and have changed significantly more in an internal direction after a 21 month interval than those mothers with a lower level of verbal interaction. There is no confirmation of hypothesis 4a. Mothers higher in positive verbalizations were not more internal at the beginning of the project. The data suggest that level of verbal interaction is not directly related to locus of control. However, it may be related indirectly perhaps through an intervening variable of potential for change. That

is, in confirmation of hypothesis 4b a mother's level of positive verbal interaction with her child predicted her movement in control orientation. If one accepts the assumption that the verbal interaction index reflects an important maternal skill, then these results conform to those of previous research. Those mothers more active verbally in mothering changed more in an internal direction. There is some evidence to suggest that this was an important skill for mothers in the project. Gordon (1969) reports some significant correlations between amount of adult (mostly mothers') positive verbal interaction and children's cognitive development as measured by the Bayley and Griffiths Scales. One could speculate that mothers, seeing their efforts reinforced by their children's progress, became more internal in generalized control expectation.

Negative Verbal Interaction (VI-)

To test hypotheses 5a and 5b which dealt with the relationship between negative verbal interaction (VI-) and I-E Control, the mothers were grouped in the same way as for the data on positive verbal interaction with a median split on their VI- index and again on education. Hypothesis 5a predicted that mothers with a higher frequency of negative verbal interactions with their child would be more external in initial I-E Control. Hypothesis 5b was that the same mothers would become more external over a 15 month interval.

Inspection of the mean I-E scores in Tables 4.5 and 4.8 and of the analyses of the variances in Tables 5.4 to 5.6 reveals no significant relationships between level of negative verbal interaction and control expectancy. Hypotheses 5a and 5b are not supported. In fact, it is interesting to note the direction of the findings is opposite

of what was predicted. Rather, the effect of negative verbal interaction for the pre, post, or change measure of I-E Control is in the same direction as that of positive verbal interaction but it is non-significant. Perhaps the word negative is a misnomer here. Statements which go into the VI- index such as: mother "in a few words directs the child to do or not to do something" might be construed as reflecting the mothering skill of setting limits. In that light, the division of mothers on this variable might result in two groups of disciplinarians, one relatively active and one passive. Consequently, the prediction would be for those mothers higher in VI- to be and become more internal. The findings do not support that prediction either but suggest that replication on another sample would be worthwhile.

Table 4

Mothers' Initial (pre), Final (post), and Changes in I-E Control Scores (SRI) Grouped by Level of Verbal Interaction and Education

Positive Verbal Interaction (VI+)

Table 4.1

Frequency of Mothers per Cell

VI+	Education: Low	Education: High
Low	9	7
High	7	9

Table 4.2

Pre SRI Cell Means

VI+	Education: Low	Education: High	Row
Low	12.33	9.43	11.06
High	11.57	12.22	11.94
Column	12.00	11.00	

Table 4.3

Post SRI Cell Means

VI+	Education: Low	Education: High	Row
Low	12.22	12.29	12.25
High	9.00	10.33	9.75
Column	10.81	11.19	

Table 4.4

Changes in SRI Cell Means (Post-Pre)

VI+	Education: Low	Education: High	Row
Low	-0.11	2.86	1.19
High	-2.57	-1.89	-2.19
Column	-1.19	0.19	

Table 4 (continued)

Negative Verbal Interaction (VI-)

Table 4.5

Frequency of Mothers per Cell

		Education	
		Low	High
VI-	Low	10	7
	High	7	8

Table 4.6

Pre SRI Cell Means

		Education		
		Low	High	Row
VI-	Low	12.50	9.86	11.41
	High	11.29	11.88	11.60
	Column	12.00	10.93	

Table 4.7

Post SRI Cell Means

		Education		
		Low	High	Row
VI-	Low	11.40	11.57	11.47
	High	10.29	10.62	10.46
	Column	10.44	11.07	

Table 4.8

Changes in SRI Cell Means (Post-Pre)

		Education		
		Low	High	Row
VI-	Low	-1.10	1.71	0.06
	High	-1.00	-1.25	-1.13
	Column	-1.06	0.13	

Table 5

Analyses of Variance of Initial (pre), Final (post), and Changes in I-E Control Scores (SRI) by Mothers' Verbal Interaction Level and Education

Positive Verbal Interaction (VI+)

Table 5.1

Pre SRI Scores

Source	Sums of Squares	DF	Mean Squares	F
Rows (VI+)	8.127	1	8.127	0.86
Columns (Education)	10.003	1	10.003	1.05
Interaction	24.890	1	24.890	2.63
Within	264.985	28	9.464	

Table 5.2

Post SRI Scores

Source	Sums of Squares	DF	Mean Squares	F
Rows	52.718	1	52.718	5.93*
Columns	3.841	1	3.841	0.43
Interaction	3.174	1	3.174	0.36
Within	248.985	28	8.892	

Table 5.3

Changes in SRI Scores (Post-Pre)

Source	Sums of Squares	DF	Mean Squares	F
Rows	102.240	1	102.240	8.45**
Columns	26.240	1	26.240	2.17
Interaction	10.286	1	10.286	0.85
Within	330.349	28	12.084	

*p .05 =4.18; **p .01 = 7.64

Table 5 (continued)

Negative Verbal Interaction

Table 5.4

Pre SRI Scores

Source	Sums of Squares	DF	Mean Squares	F
Rows (VI-)	0.28	1	0.28	0.03
Columns (Education)	9.07	1	9.07	0.92
Interaction	20.99	1	20.99	2.13
Within	275.80	28	9.85	

Table 5.5

Post SRI Scores

Source	Sums of Squares	DF	Mean Squares	F
Rows	8.03	1	8.03	0.76
Columns	0.12	1	0.12	0.01
Interaction	4.30	1	4.30	0.40
Within	297.36	28	10.62	

Table 5.6

Changes in SRI Scores (Post-Pre)

Source	Sums of Squares	DF	Mean Squares	F
Rows	11.37	1	11.37	0.72
Columns	11.33	1	11.33	0.72
Interaction	21.47	1	21.47	1.36
Within	441.84	28	15.78	

Education, Verbal Interaction, and I-E Control

Hypothesis 6 stated that mother's educational level would not significantly effect I-E Control and that education and level of verbal interaction either positive or negative would not have a significant interaction effect on I-E Control. Table 4 shows small differences between I-E scores of mothers high on educational level and those low in education. The analyses of variance in Table 5 indicate these differences are not significant.

The data confirm hypothesis 6 and previous research that within a relatively homogeneous population there is no relationship between level of education and internal vs external control expectancy. Education also did not interact significantly with level of either positive or negative interaction to affect expectancy scores.

Infant Cognitive Development

Influence of Mother on Child

Hypothesis 7a predicted that children of mothers more internal in control expectancy would learn more and be more highly developed cognitively by the time they reached their second birthday. Tables 6, 7, and 8 show the results. The assessment of the effect of mother's control expectancy was done in several ways. First, to control for differences in the child's initial achievement, the child's achievement scores were plugged into the short term prospective model (Wenar and Wenar, 1964). The children were grouped first according to whether their mothers were above or below the median in initial expectancy, then according to whether they were high or low in initial achievement.

In apparant contradiction to the hypotheses, the children of initially more external mothers learned more although the difference does not reach a significant level of probability. However, this is only true when the amount of achievement is calculated from the child's 6 month score. Table 7 shows that there is no significant relationship between the child's initial and later achievement and little difference between children of external vs internal mothers in the child's achievement during his second year of life. In fact, because of a ceiling effect there is a reversal. Children of more internal mothers learn more in the second year. This suggests, since the series test had a finite number of items and there was a significant inverse relationship between initial achievement score and what was left to learn, that children learned about the same number of items over two years regardless of their mother's expectancy but the children of the more external mothers learned more by the time they were 6 months old. They then learned less than children of more internal mothers over the next 18 months. This is supported by the findings in Table 8. There is a difference of less than one item achieved by children of external vs internal mothers, at either 18 or 24 months of age. Thus, mother's I-E control expectancy is not related to her child's progress on the series test.

Table 8 further indicates no significant relationship between maternal expectancy and children's scores on the standardized cognitive development scales. Although these results are in the predicted direction, the hypothesis that mother's control expectancy influences her infant's cognitive achievement is not supported.

Influence of Child on Mother

Hypothesis 7c predicted that a child's achievement would significantly affect his mother's I-E Control expectancy. The hypothesis stated that the children who achieved more or were more highly developed cognitively would effect changes in their mothers' expectancy in an internal direction. The results were analyzed the same way as for the assessment of the influence of mother on child. In this procedure changes in mothers' expectancy scores were plugged into the model(Table 9). There were no significant relationships between child's initial achievement or mother's initial expectancy and changes in maternal expectancy.

Hypothesis 7b predicted that mothers of more highly developed children would be more internal in final expectancy. Children's success over the course of the project as measured by their final Series Test scores and the standardized tests was not found to be significantly related to a mother's final expectancy or changes in expectancy. (See Table 10). Again, although most of the results were in the predicted direction, hypothesis 7b is not confirmed.

At the end of the project mothers of children who achieved more were more internal than the mothers of less successful children. This is not true of changes in expectancy over the duration of the project. With one achievement measure (Griffiths) mothers of higher scoring children became more internal. With a second (Bayley) there was no difference and with a third (Series Test) they became more external.

While there is some evidence that mothers' control expectancy and their childrens' achievement affect each other, the results were not reliable. However, the results were suggestive and were investigated further with a new sample in Study II.

Effects of Participation

Amount of Participation

Hypothesis 8: Mothers who participate longer in a program (about 21 months) to improve their mothering skills will become more internal in I-E Control than those who participate a shorter amount of time (9 months).

Insufficient data were available to test differences between mothers who did versus those who did not participate in the project. The parent educators were not able to reach enough mothers in treatment groups 3 to administer the SRI. There were 21 mothers each in group 1 and 2 who were given the SRI when their babies were 6 months old and again 15 months later. The tests between these groups which appear in Table 11 assess the effects of maternal expectancy and expectancy changes of 9 vs 21 months of participation in the project.

The results do not support the hypothesis that longer participation changes control expectancy in an internal direction. Mothers who participated longer were more external and changed more in an external direction than mothers who did not participate in the second year of the project. The change for all 42 mothers was a mean of 0.02 which suggests the project did not effect changes in control expectancy. However, these findings are not too meaningful in the absence of a control group. A no treatment control group was available for Study II.

Quality of Participation

Hypothesis 9a stated that mothers who make better use of the program as manifested in such behaviors as keeping appointments and mastering materials will be more internal in initial I-E Control. Hypothesis 9b

Table 6

Changes in Children's Series Test Scores (6-24 months)
Grouped by Their Initial Score and Their Mother's Initial Expectancy

a. Means

Child's 6 Month Series Score

		Low (N=16)	High (N=19)	Row Means
Mother's Initial Expectancy	Internal (N=19)	35.33	27.08	29.68
	External (N=16)	35.50	31.33	33.94
	Column Means	35.44	28.42	

b. Analysis of Variance

Source	df	Mean Squares	F
Rows	1	38.34	2.73
Columns	1	302.45	21.50**
Interaction	1	32.80	2.33
Within	31	14.07	

**p = < .001

Table 7

Changes in Children's Series Test Scores (12-24 months)

a. Means

Child's 6 Month Series Score

		Low (N=16)	High (N=15)	Row Means
Mother's Initial Expectancy	Internal (N=16)	11.17	8.50	9.63
	External (N=15)	9.10	6.80	8.33
	Column Means	9.88	8.07	

b. Analysis of Variance

Source	DF	Mean Squares	F
Rows	1	27.77	1.81
Columns	1	40.10	2.51
Interaction	1	0.05	0.00
Within	27	15.36	

Table 8

Differences Between Success Scores of Children Grouped According to I-E Scores of Their Mothers at the End of 24 Months

Achievement Measure	Mother's Expectancy: Internal	External	t
Bayley Mental Development Scale	83.55	80.50	0.97
Griffiths Mental Development Scale	112.79	109.56	1.18
Series Test (24 months)	44.17	43.53	0.56

Table 9

Changes in Mothers' Expectancy Scores (I-E) Scores (3-21 months) Grouped by Their Initial Score and Their Child's Achievement at 6 Months

a. Means

Mother's Initial Expectancy	Child's 6 Month Series Score: Low	High	Row Means
Internal (N=21)	1.14	0.36	0.62
External (N=21)	-0.29	-1.14	-0.57
Column Means	0.19	-0.14	

b. Analysis of Variance

Source	df	Mean Squares	F
Rows	1	20.012	1.30
Columns	1	6.298	0.41
Interaction	1	0.012	0.00
Within	38	15.415	

Table 10

Differences Between I-E Scores (Final SRI and Changes Over 15 Months) of Mothers According to Achievement of Their Children

Achievement Measure		Final (Post) SRI Score		
		N	$\bar{X}$	t
Bayley	Low	16	11.13	1.08
	High	17	9.94	
			Changes in SRI Score (Post-Pre)	
	Low	16	0.37	0.00
	High	17	0.37	
			Post SRI	
		N	$\bar{X}$	t
Griffiths	Low	17	10.94	0.36
	High	16	10.63	
			Change SRI	
	Low	17	1.29	1.47
	High	16	-0.63	
			Post SRI	
		N	$\bar{X}$	t
24 Month Series	Low	16	10.88	0.59
	High	18	10.11	
			Change SRI	
	Low	16	-0.44	1.10
	High	18	1.06	

Table 11

Differences Between Treatment Groups in Initial, Final and Changes in Expectancy Scores (SRI)

	Treatment Group		
Mother's Expectancy	1 (21 mo) (N=21)	2 (9 mo) (N=21)	t
Initial	10.43	11.86	-1.39
Final	11.24	11.10	0.14
Change	0.81	-0.76	1.34

Table 12

Differences in I-E Control Expectancy Scores (SRI) Between Mothers Rated High & Low in Project Involvement (PEP)

	Mothers' Positive Attitude Index (PEP)		
Mothers' Expectancy	Low (N=20)	High (N=22)	t
Initial	11.30	11.00	0.44
Final	11.45	10.91	0.77
Change	0.15	-0.09	0.28

stated that such mothers would also become more internal in I-E Control over a 15 month interval. In order to test these hypotheses mothers above and below the median on the PEP index were compared on their expectancy scores at the beginning and end of the project.

Table 12 reveals no significant differences in expectancy between mothers high on the PEP index versus mothers low on the index. The two hypotheses are rejected. Mother's degree of involvement in a program to improve her mothering skills was not significantly related to her I-E Control expectancy or her changes in expectancy over the course of participation.

The reasoning for this hypothesis was in line with other studies: those subjects who knew more about their role, who made a greater commitment to it and who actually did perform their role in the project better would be those who were more internal in control expectancy. It would seem that the mothers did not perceive their involvement in the project as crucial to their general life situation or at least not in the way that the items measured it. Some of the items, e.g. those dealing with the number and punctuality of appointments kept, may reflect a middle class bias. Furthermore, it is possible that the project was not completely successful in getting the mother to identify with the role of her child's teacher despite the heavy emphasis by the parent educators (Gordon, 1969) of the importance of the mother in influencing her child's cognitive growth.

Perhaps a more fruitful way to conceive of this variable is as an index of maternal activity which in interaction with another maternal

activity variable such as verbal level might have an effect on maternal expectancy. This was attempted in Study II.

CHAPTER 7 STUDY I: CONCLUSIONS

As expected and in line with previous research, the present sample of lower class mothers was found to be more external in locus of control than samples not restricted to the lower class. Within this lower class sample, black mothers were more external than whites. The age, number of children or education of the mother were not significantly related to control expectancy.

The number of positive verbalizations of a mother to her child was related to her I-E Control with those mothers verbalizing more more internal in control. On the other hand, negative verbalizations were not related to I-E Control; behaviors presumed to manifest mothers' involvement in the project and the teaching role were not related to I-E Control.

The prediction of a two way relationship between maternal expectancy and her child's achievement was not borne out. The findings were suggestive of a relationship but were not reliable.

In an naturalistic study such as this with several variables beyond the experimenter's control, the reliability of the data increases as procedures improve with the benefit of practice and hindsight. For example, in Study I time needed to solidify data collection plans precluded the availability of a purer measure of the mother's initial expectancy. That is, she entered the project when her baby was three

months of age but was not given the SRI until three months later. Thus, possible changes in expectancy during the first three months of participation might have been lost. Furthermore, missing data prevented the availability of a control group to contrast with a participation group to assess the effect of participation on control expectancy. Study II was planned with more adequately controlled procedures to get a more reliable assessment of the variables investigated in Study I.

CHAPTER 8 INTRODUCTION TO STUDY II

Three new groups of mothers were available for investigation of the relationships between their level of verbal interaction, their degree of involvement in the project, the effect of their participation in a program to enhance their mothering skills and their I-E Control. The two way relationship between mother's I-E Control and her child's achievement and the effect of class, race, education and parity of the mother and her I-E Control were also re-investigated using this new sample.

Better controlled procedures were used in Study II. The parent educators were more experienced researchers. That is, their observation and recording skills had improved. Entry scores instead of entry plus 3 month scores on the I-E Control Scale were available as the measure of initial expectancy. The re-test on the scale was given at the end of the mothers' participation in the program instead of 3 months before the end of the project as the measure of final expectancy. Thus, changes in I-E Control scores (final-initial scores) more accurately reflected changes in expectancy as effected by project participation, and maternal behaviors measured during the course of the project. Furthermore, the test-retest interval was shorter (9 months). Consequently, the retest reliability of the I-E Scale which tends to diminish significantly over intervals greater

than 6 months (Kiehlbauch, 1968) was increased. Finally, two new control groups were used: a non-participant control group was available to test the effect of participation on I-E Control and a control group that participated in a modified program to test the effect of participating in a specific type of program on I-E Control.

Some conceptual changes were made in line with suggestive findings from Study I. The negative verbal interaction (VI-) and positive attitude (PEP) indices were conceived of as measures of maternal activities which singly or in interaction would be related positively to internal control. When these measures did not relate significantly to I-E Control in Study I, the items were re-examined. The author felt that these items perhaps reflected the mother's level of activity and amount of involvement with the role of her child's teacher in the same way that the items which make up the positive attitude index (VI+) do. In fact, the VI- index varied with I-E Control scores in the same direction as but with slightly less magnitude than the VI+ index. In addition, the author was also interested in investigating whether certain combinations of these variables would interact to effect I-E Control.

Level of mother's education showed no reliable tendency to affect mother's I-E Control and also showed no significant interaction with verbal level in its effect on I-E Control in Study I. Consequently, the prediction in Study II was that education would be insignificantly correlated with I-E Control.

CHAPTER 9 HYPOTHESES FOR STUDY II

The hypotheses for the second study are the same as for Study I except for the changes discussed in Chapter 8.

Demographic Variables

1. The present sample of lower class mothers will be more external in I-E Control than previously studied samples that were not restricted to the lower class.

2. Black mothers will be more external than white mothers.

3. There will be no significant correlations between mother's age, parity or education and I-E Control.

Maternal Behaviors

4. Mothers who have a higher frequency of behaviors related to their role as child's teacher: a. Positive verbal interaction (VI+) b. Negative verbal interaction (VI-) c. Positive attitude towards a program to enhance her teaching skills (PEP), will be more internal in I-E Control than mothers with a lower frequency of these behaviors.

5. Mothers with a higher frequency of behaviors listed in hypothesis 4a, b, and c will also become more internal in I-E Control over a 9 month interval.

6. There will be a significant interaction effect between mothers' positive verbal interaction and positive attitude towards a program to enhance her teaching skills (PEP) on I-E Control expectancy changes.

7. There will be a significant interaction between mothers' negative verbal interaction frequency and positive attitude towards a teaching program (PEP) on I-E Control expectancy changes.

Infant Cognitive Development

8. There will be a significant two way relationship between mother's I-E Control and her child's cognitive development such that:

a) Children of mothers more internal in I-E Control will learn more and be more highly developed by the end of their first year of life than children of mothers more external in I-E Control.

b) Mothers of children who are more highly developed cognitively will be more internal in I-E Control than mothers of less well developed children. These mothers will also become more internal over a 9 month interval.

Effects of Participation

9. Mothers who participate in a program to improve their mothering skills will become more internal in I-E Control than mothers who do not.

10. Mothers who participate in two different programs to improve their mothering skills will not differ in I-E Control score changes over the program's duration.

CHAPTER 10 STUDY II: METHODS

Sample

The subjects were selected using the same criteria as for Study I. Thus, they were from indigent families. Infants with complications possibly related to cognitive development were screened out. These 54 mothers and their infants began participating in the Parent Education Project (see Chapter 2) one year after the subjects in Study I.

Design

The treatment plan for the groups in this study is outlined in Table I (page 5). In that table they are referred to as groups 4, 5, and 6. The first experimental group (here called E1) received weekly visits from a parent educator from the time the baby was 3 months old until his first birthday. The parent educator used teaching materials designed by the professional staff of the Parent Education Project (see page 26, Stimulation Series) in working with the mother. Another experimental group (E2) also received weekly visits from a parent educator. However, these educators, also indigenous non-professionals, planned their own teaching program based on their own experiences working in Head Start and nursery school programs. They were supervised by a research assistant on the Staff of the Parent Education Project but one who had no specific knowledge of the Series Test. A control group (C) of mothers and infants received no treatment but was

tested.

All three groups of mothers were given the I-E Scale (SRI) at their entry into the project (infant is 3 months old) and again at the end (infant is one year old). The infants were given the Series Test at 6 months old and at their first birthday. They were also given the Griffiths Test at one year old. Except for the control group families who were not visited, the parent educators recorded their observations after each weekly visit on the PEWR.

Data Analyses

The measures used are identical with the instruments and indices used in Study I. The hypotheses concerning class and race were tested by t tests of differences between groups on their I-E scores. The remaining demographic variables were tested calculating a Pearsonian r between each independent variable and I-E Control scores and a multiple r between all the independent variables and I-E scores.

The hypotheses concerning maternal behaviors were tested by t tests of mothers' initial (pre), and final (post) I-E scores by an analysis of variance of changes in mothers' I-E Control scores grouped by median splits on the three maternal behavior indices.

The relationship between maternal I-E Control and child cognitive development was tested first by splitting mothers at the median on their I-E scores and calculating a t for the difference between their children's achievement scores, then by splitting children at the median of their achievement scores and doing a t test of the difference between their mothers' I-E scores.

The effects of participation were assessed by t tests of the differences between experimental and control groups on their final I-E score

and I-E score changes. The difference between the two experimental approaches was assessed by a t test of the differences between groups E1 and E2 in final I-E score and I-E score changes.

CHAPTER 11 STUDY II: RESULTS AND DISCUSSION

Demographic Variables

Class

Hypothesis 1 states that the present sample of lower class mothers would be more external in I-E Control than previously studied samples not restricted to the lower class. The results in Table 13 replicate those of Study I. The National Stratified sample and the prisoners (from varied socioeconomic backgrounds) were significantly more internal than the present sample of indigent mothers. Thus, hypothesis 1 is confirmed.

The comparison of the Project Follow Through educators with the disadvantaged mothers again indicates within class differences in I-E Control. Again one can speculate that the women hired for Follow Through have received reinforcement for their personal characteristics and skills. This is consistent with Rotter's (1966) theory that consistent reinforcements for personal qualities and abilities leads to adoption of the internal control expectancy.

Race

Inspection of the data in Table 14 reveals that the hypothesis for a racial difference in I-E Control supported by the Study I findings is not supported here. Although Negro mothers are more external than Caucasian mothers both at the beginning and end of their project participation, the difference does not reach a significant level.

Table 13

A Comparison of Three Different Populations with Project Mothers on I-E Scores

Group	Scale	N	$\bar{X}$	s	t
National Stratified Sample 10th, 11th, 12th grades (Franklin, 1963)	I-E	1,000	8.50	13.99	2.91*
Prisoners, 18-26, 8th grade plus reading (Ladwig, 1963)	I-E	80	7.72	13.32	3.61**
Follow Through Educators (Gordon, 1969)	SRI	40	7.21	12.82	3.68**
Project Mothers	SRI	54	10.04	14.59	

* .01 level of significance
** .001 level of significance

Table 14

Differences Between Black and White Mothers in Initial and Final I-E Control Scores

Initial Expectancy	N	$\bar{X}$	t
Blacks	43	10.26	0.84
Whites	11	9.18	
Final Expectancy			
Blacks	43	9.02	1.15
Whites	11	7.64	

Table 15

Correlations Between Education, Age, Parity and Initial (pre), Final (post), and Changes in I-E Scores (N=28)

SRI Score	Education (E)	Age (A)	Parity (P)	$Multiple_{SRI \cdot EAP}$
Pre	.00	-0.22	0.20	0.26
Post	-0.13	-0.30	0.25	0.38
Change	-0.08	-0.13	0.01	-0.14
Means	10.21 years	19.25 years	2.61 children	

p=.05
=0.37

Table 15.1

Analysis of Variance of the Multiple Correlation of Age, Parity, and Education with Final I-E Control Scores

Variable Entered	Multiple r	Source	df	Mean Squares	F Ratio	p=.05
Age	0.30	Regression	1	29.37	2.55	4.22
		Residual	26	11.54		
Parity	0.37	Regression	2	23.63	2.09	3.38
		Residual	25	11.29		
Education	0.38	Regression	3	15.80	1.35	3.01
		Residual	24	11.75		

It should be kept in mind, however, that the mean difference of 1 between blacks and whites is typical of previous studies. Lefcourt and Ladwig (1965b) found a similar difference which held up as significant on a larger N (120). Kiehlbauch found a slightly smaller difference in the same direction on an N of 80 which was also non-significant. If Study I is included, all four studies combined show an average difference of more than one. While the question bears further investigation, a review of all the studies strongly suggests there is a racial difference in I-E Control albeit small as measured by Rotter's scale.

Age, Parity, and Education

Hypothesis 3 predicted that there would be no significant correlation between mother's age, parity and education and I-E Control. Table 15 shows the correlations of these three variables with initial (pre), and final (post) expectancy (I-E Control scores) and changes in expectancy. The correlations are small (0 to 0.25) and insignificant. Table 15.1 indicates the degree to which the variables predict expectancy scores if weighted and combined (multiple r). The variance indicates prediction of I-E Control scores from age, parity and educational level of the subjects is non-significant.

Hypothesis 3 is confirmed. As predicted, age, parity, and education of the mother was not significantly related to I-E Control. Even in combination these three variables could not predict expectancy changes significantly better than chance.

Maternal Behaviors

Positive Verbal Interaction (VI+)

Hypothesis 4a stated that mothers with a higher frequency of

Table 16

Differences in Mean Initial & Final I-E Scores
Between Mothers Above & Below the Median on Behavior Indices

			Initial Expectancy		Final Expectancy	
Behavior Index		N	$\bar{X}$	t	X	t
Positive Verbal Interaction (VI+)	High	14	10.43	-0.39	8.86	-1.08
	Low	14	9.86		7.43	
Negative Verbal Interaction (VI-)	High	14	8.64	2.21*	7.93	0.33
	Low	14	11.64		8.36	
Positive Attitude Toward Project (PEP)	High	14	9.57	0.84	7.29	1.30
	Low	14	10.71		9.00	

*$p < .05$

Table 17

Analysis of Variance of Changes in Mothers' I-E Scores Effected by Positive Verbal Interaction (VI+) and Positive Attitude Toward Project (PEP)

a. Means

		Positive Attitude (PEP)		
		Low (N=14)	High (N=14)	Row Means
VI+	Low (N=14)	-1.33	-4.40	-2.43
	High (N=14)	-2.40	-1.11	-1.57
	Column Means	-1.71	-2.29	

b. Analysis of Variance

Source	df	Mean Squares	f
Rows	1	7.936	0.47
Columns	1	5.079	0.30
Interaction	1	30.489	1.81
Within	24	16.887	

Table 18

Analysis of Variance of Changes in Mothers' Expectancy Effected by Negative VI & Positive Attitude

Positive Attitude

a. Means

		Low (14)	High (14)	Row Means
VI-	Low (14)	-2.00	-5.00	-3.29
	High (14)	-1.33	-0.25	-0.71
	Column Means	-1.71	-2.29	

b. Analysis of Variance

Source	df	Mean Squares	f
Rows	1	50.298	3.31
Columns	1	6.298	0.41
Interaction	1	28.583	1.88
Within	24	15.201	

positive verbal interaction would be more internal in I-E Control than mothers with a lower frequency of positive verbal interaction. Hypothesis 5a was that these mothers would also become more internal over a 9 month interval. Tables 16 and 17 summarize the findings.

Inspection of the means and t score in Table 16 reveals that mothers above and below the median on the VI+ index do not differ significantly in initial expectancy. This finding is consistent with that in Study I. However, contrary to the finding in Study I mothers high and low on this index do not differ significantly in final I-E scores. In addition, inspection of the mean change I-E scores and the row variance in Table 17 reveals these mothers do not differ significantly in expectancy changes. In fact, these findings tend to be in the opposite direction. That is, mothers with a higher frequency of positive verbal interaction are more external after a 9 month interval and have changed more in an external direction. Hypotheses 5a and 6a were not confirmed. The significant findings on positive verbal interaction and I-E Control in Study I were not replicated.

Negative Verbal Interaction

Hypothesis 4b stated that mothers with a higher frequency of negative verbal interaction (VI-) would be more internal in I-E Control than mothers with a lower frequency of negative verbal interaction. Hypothesis 5b predicted that these mothers would also become more internal over a 9 month interval.

Inspection of the means and t score in Table 16 reveals that mothers above and below the median on the VI- index differ significantly in I-E Control. As predicted, mothers higher on this index were initially

more internal. However, after a 9 month interval there is no longer a significant difference between mothers high and low on this index in their I-E scores. Inspection of mean I-E change scores in Table 18 shows that mothers low on VI- change considerably more in an internal direction. While the change is relatively large, analysis of the row variance shows that it is not significant and the findings tend to be in the opposite direction of Study I in which mothers higher in the VI- index became more internal. Differences between these findings in Study I and Study II will be discussed at the end of the section on maternal behaviors.

The hypotheses are generally not supported in Study II. However, one wonders about the relationship between the VI- index and initial expectancy in Study II. Mothers who use more negative verbalizations initially are significantly more internal than those who use less. Over the duration of the project mothers lower in negative verbalizations change more in an internal direction. Thus, at the end of the project the difference between high and low negative verbalizers has become insignificant. Perhaps participation in the project has a leveling effect on I-E Control which obscures other variables. A control group of non-participants on whom behavior indices were available would be necessary to test the significance of this effect. It also must be kept in mind that the scale has a floor of zero. At a mean of 8.64, the scores of the high VI- mothers were not as free to vary downward as the scores of the low VI- mothers. This suggests a more optimal instrument for this variable would be one which discriminated better at the more internal extreme.

Positive Attitude Towards a Program to Enhance Mothers' Teaching Skills (PEP)

Hypothesis 4c stated that mothers with a higher frequency of behaviors which reflect their positive attitude towards a program to enhance their teaching skills (PEP) would be more internal than mothers with a lower frequency of such behaviors. Hypothesis 5c predicted that these mothers would also become more internal in I-E Control over a 9 month interval during which time they participated in this program.

Inspection of the means and t scores in Table 16 and of the analyses of the column variances in Tables 17 and 18 reveals small but non-significant differences in I-E scores at the beginning or end of their participation in the program and in changes in I-E scores between mothers high and low on the PEP index. This is consistent with the Study I findings. Mother's attitude toward the program she is participating in as measured by the PEP index was not found to have any significant, main effect on her I-E Control Expectancy.

Positive Attitude and Positive Verbal Interaction

Hypothesis 6 predicted an interaction effect between positive verbal interaction and positive attitude towards the project(PEP) on I-E Control expectancy changes. Inspection of the interaction variance in Table 17 reveals no significant findings. Hypothesis 6 is not supported.

Positive Attitude and Negative Verbal Interaction

Hypothesis 7 predicted an interaction effect between negative verbal interaction and positive attitude (PEP) on I-E Control expectancy changes. Analysis of the change score variances in Table 18 reveals no significant interaction term. Hypothesis 7 is not supported.

Positive attitude towards or active involvement with a program to improve child teaching skills as assessed by the PEP index did not have significant main effects or interaction effects with level of verbal interaction (positive or negative) on mothers' I-E Control expectancy. However, it is interesting to note (see Tables 17 and 18) that mothers lower in verbal activity (either positive or negative) and higher in project involvement became the most internal (a change of 4-5 scale points). This may suggest incompatibility between the two maternal behaviors. The observations which go into the behavior indices are made when the parent educator is working with the mothers. Those mothers who got the most out of the project may have spent more time listening to the materials presented than talking to their babies.

Maternal Behaviors Summarized

Of the three behaviors studied (VI+, VI-, PEP) only negative verbalizations were related to mother's control expectancy assessed when her baby was three months old. None of the behavior indices were related reliably to final expectancy, neither were they singly or in interaction significantly related to expectancy changes. Final expectancies were in the predicted direction for positive attitude and level of negative verbal interaction but not for level of positive verbal interaction. That is, mothers higher in frequency of verbal commands and negatively toned verbalizations during their child's first year of life were more internal while those higher in frequency of verbalizations of tender, loving care were more external. The findings on positive verbalizations are opposite those of Study I, and Study II involved babies one year younger. Perhaps the mothers found negative

verbalizations more effective in coping with younger infants, and positive verbalizations more effective in coping with older ones. Possibly this greater or lesser degree of effectiveness was slightly related to I-E Control.

Inconsistences and non-reliable findings in the two studies on the maternal behavior variables and I-E Control may also be a function of the limitations of the measures used. While validity studies of the behavior indices have been reported (p23) no refinement of the internal consistency of the items or investigation of the factorial composition of the indices has been attempted. Quite possibly individual items or factors from these behavior indices might provide a better test of the relationship between the variable each index is purported to measure and I-E Control. As presently constituted each index is a rough measure of its respective variable.

Then too, the I-E Control Scale, as was mentioned in an earlier section, has a low re-test reliability over an interval beyond 6 months. If changes in expectancy over time are to be related to other variables such as maternal behaviors in future research, it seems necessary to use a control group for which measures on such variables are available and/or to develop a more stable measure of I-E Control.

Infant Cognitive Growth

Hypothesis 8 predicted a significant two way relationship between mother's I-E Control and her child's cognitive development. As in Study I there were no significant relationships in either direction. The findings in Table 19 indicate no significant effect of mother's I-E Control on her child's progress on the Series Test at either 6

(Table 19.1) or 12 months (Table 19.2) or on his overall intellectual growth as measured by the Griffiths Test (Table 19.3).

Inspection across Tables 19.1, 19.2, and 19.3 reveals that the children of initially more external (higher scores) mothers progress more on the series by the time they are 6 months old. Then perhaps (because of missing data they are not exactly the same subjects) there is a reversal. The children of initially more internal (lower scores) mothers are slightly ahead on the series by their first birthday. These same (with two exceptions) children are also more highly developed in intellectual growth as measured by the standardized (Griffiths) test.

At 12 months old (after 9 months' participation in the Parent Education Project) children of mothers who are more internal at the end of their participation have learned somewhat more on the series and score higher on the Griffiths Test. However, none of these trends are significant.

Furthermore the results are weakened by the reversed relationship between changes in mother's I-E Control and her child's achievement on the Series Test and the Griffiths at 12 months. That is, the children of mothers who change more in an internal direction are less developed cognitively. Since mothers who were more internal at the pre and post test of the SRI had children that were more developed cognitively the reversal of this relationship for the SRI change measure suggests different mothers are grouped as internal for each of the SRI measures. As in the preceding section of this paper, this again questions the re-test reliability of the I-E Scale.

The findings in Table 20 indicate no significant effect of a child's

Table 19

Differences Between Achievement Scores of Children Grouped by Median Split of Mother's Initial (Pre), Final (Post) and Changes in I-E Control (SRI) Scores

Table 19.1

Series Test Scores (6 months)

Pre SRI		t
low (N=8)	9.13	-0.62
high (N=6)	10.33	

Table 19.2

Series Test Scores (12 months)

Pre SRI		t	Post SRI		t
low (N=15)	34.60	0.59	low (N=14)	34.17	0.50
high (N=13)	33.62		high (N=14)	33.41	

Change SRI		t
low (N=16)	32.67	-1.35
high (N=12)	35.11	

Table 19.3

Griffiths Test Scores

Pre SRI		t	Post SRI		t
low (N=14)	112.00		low (N=13)	111.77	1.05
high (N=12)	107.08		high (N=13)	107.69	

Change SRI		t
low (N=14)	109.80	-0.91
high (N=12)	114.25	

achievement on his mother's I-E Control. Progress on the Series Test at 6 months was not significantly related to mother's initial expectancy (Table 20.1). Children who learn more initially have more external mothers but by the time they are a year old children who have progressed more on the series have mothers with the same expectancy as children who have progressed less (Table 20.2). Children who scored higher on the standardized test of infant cognitive growth have mothers who are more internal in final expectancy.

Table 20.3 indicates a surprising but insignificant trend. Mothers of children who score lower on the achievement tests change more in an internal direction. This is opposite from what one would expect from previous research indicating an inverse relationship between failure and internality as summarized in the literature review of this paper.

The hypothesis of mutual influence between maternal I-E Control and child achievement must be rejected. A mother's expectancy about events in the world is too general to be influenced by a specific achievement of her child. This is perhaps too small a sample of her infant's behavior after too short a time in the infant's life to change her overall expectancies of internal control. It probably takes a wider range of her own and her child's life activities and circumstances to influence this orientation. Even within the area of possible influence on her child's achievement, especially considering the variability of intelligence tests at this age, the effect may be reduced by the lack of reliability of these tests as indicators of the child's overall cognitive growth. The lack of reliability of this relationship is further reduced by the presence of many intervening variables such as the difficult field conditions under which the attitude and intellectual tests were administered

Table 20

Differences Between Initial (Pre), Final (Post), and Changes in I-E (SRI) Scores of Mothers Grouped by Median Split of Children's Achievement Scores (6 and 12 Month Series Tests, and Griffiths Test)

Table 20.1

Pre SRI Scores

Series Test (6 month)	t
low (N=7) 10.10 high (N=7) 10.10	0.00

Table 20.2

Post SRI Scores

Series Test (6 month)	t	Series Test (12 month)	t
low (N=8) 8.25 high (N=9) 9.44	-0.74	low (N=14) 9.30 high (N=12) 9.30	0.00

Griffiths Test	t
low (N=12) 8.75 high (N=14) 7.43	0.97

Table 20.3

SRI Score Changes

Series Test (6 month)	t	Series Test (12 month)	t
low (N=7) -3.00 high (N=7) -2.14	-0.40	low (N=12) -2.50 high (N=12) -0.75	-1.06

Griffiths Test	t
low (N=12) -2.92 high (N=14) -1.29	-1.03

(Gordon, 1969) and the low re-test reliability of the I-E Scale for an interval greater than 6 months.

Variables also intervene between mother's expectancy of I-E Control and child achievement which reduce the strength of relationship between the two variables. As was seen in the immediately preceding section of this study, behaviors (herein called PEP and VI- respectively) which researchers have found related to children's achievement, such as mother's amount of participation, and frequency of imperative statements without rationale (Grotberg, 1969) were not related to control expectancy.

Effects of Participation

Hypothesis 9: Mothers who participate in a program to improve their mothering skills will become more internal in I-E Control than mothers who do not.

The relevant results are summarized in Table 21. Hypothesis 9 is mostly supported. While there are no significant differences between the experimental and control groups in pre or post test means, changes in expectancy approach the .05 level of significance. The actual probability level is .07 for a two tailed test. This seems close enough to the conventional level to consider the results significant. Thus, mothers who participate in the project become significantly more internal in control orientation than those who do not. This is consistent with research findings (Neal and Seeman, 1964; Seeman and Evans, 1962; Seeman, 1963; Kiehlbauch, 1968; Strickland, 1965) that persons affiliated with social action groups or involved in activities to promote improvement in their life circumstances are more internal than those who are not.

Table 21

Differences in Initial (pre), Final (post), and Changes in I-E Control Expectancy Scores (SRI) Between Experimental (E) and Control (C) Groups

Group	Pre SRI $\bar{X}$	t	Post SRI $\bar{X}$	t	Change SRI $\bar{X}$	t
E (N=28)	10.14	0.21	8.14	1.45	-2.00	1.87*
C (N=26)	9.92		9.73		-0.19	

Table 22

Differences in Initial (pre), Final (post), and Changes in I-E Control Expectancy Scores (SRI) Between the Two Experimental Groups (E1+E2) and the Control (C) Group

Group	Pre SRI $\bar{X}$	t	Post SRI $\bar{X}$	t	Change SRI $\bar{X}$	t
E1 (N=14) vs	10.07	-0.10	8.93	1.20	-1.14	1.12
E2 (N=14)	10.21		7.36		-2.86	
E1 vs	10.07	0.11	8.93	-0.66	-1.14	-0.75
C (N=26)	9.92		9.73		-0.19	
E2 vs	10.21	0.24	7.36	-2.10**	-2.86	-2.24**
C	9.92		9.73		-0.19	

* .07 probability level
** .05 probability level

In the Head Start Program (Kitano, 1967 in Grotberg, 1969) designed to assess the effects of participation in a parent education program on parents, the author found that participation was not significantly related to differences in powerlessness as measured by the UCLA Alienation Scale. In view of this finding, despite the fact that a different instrument was used to measure locus of control, the lack of positive findings between the two treatment groups in Study I and the marginally significant finding in the present study, further investigation of the issue seems necessary.

Hypothesis 10: Mothers who participate in two different programs to improve their mothering skills will not differ in I-E Control score changes over the program's duration.

Table 22 summarizes the relevant findings. Hypothesis 10 is supported. There are no significant differences between experimental groups in expectancy. However, the more important finding is that while there are no significant differences in final expectancy and expectancy changes between experimental group 1 and the control group, there are between experimental group 2 and the control group.

This suggests that the parent educators (who had experience in Head Start and nursery programs) who participated in designing the stimulation materials and mothers' education program had a significant effect in changing mothers' expectancies. The parent educators who used materials and programs designed by the professional staff rather than designing their own did not significantly affect the changing expectancies of the mothers with whom they worked.

This finding was surprising considering the heavy emphasis in both

treatment programs on imbuing the mother with the feeling that her involvement in the program was crucial to her child's cognitive growth (Gordon, 1969). Perhaps the educators who planned their own program developed or already had a belief analagous to generalized internal control: That is that participation in their program rather than external variables would result in the mothers' improvement in child teaching skills. Perhaps they communicated this belief to the volunteer mothers they worked with.

Since the two experimental groups of mothers and children did not differ significantly in success as measured by the children's final achievement scores (Gordon, 1969) it seems reasonable to assume that characteristics of the parent educators had a significant effect. Previous research in social psychology suggests that the parent educators who planned their own program would be more involved in and committed to their jobs.

Studies by Lewin (1958), Pelz (1958) and their colleagues found participation in a group discussion in which a decision was made was significantly more effective in changing the social conduct of mothers than lectures, individual instruction or group discussion without group decision. Group discussion and decision were felt to be necessary for effecting increased involvement in and commitment to an action.

It is interesting to note that the techniques used to teach the parent educators who worked with the experimental group 1 mothers included lectures, individual supervision and group discussion. The professional staff was sensitive to the educators' individual needs and problems and often incorporated their suggestions into the procedures. However, only the educators who worked with the mothers in experimental

group 2 decided as a group what the exact nature of their program would be. Consistent with the Lewinian studies then, these educators would be more actively involved in and committed to their program. This greater involvement could have rubbed off on the mothers in experimental group 2 resulting in the mothers' developing a stronger belief in an individual's ability to influence her own life.

There are, of course, other possible differences between the educators of the two groups which may have made them more effective in altering existing expectancies. Most obviously, Group E2 parent educators probably had more experience in working with disadvantaged families. Assessment of differences in characteristics between the parent educators related to their effectiveness in giving mothers a belief that persons can control their own destinies could be the subject of another study. In fact, the whole area of the etiology of control expectancies is relatively virginal research territory. This author was only able to find one study. Tolor and Jalowiec (1968) found that college students who rated their mothers higher in authoritarian attitudes on the PARI were more external than those that did not.

CHAPTER 12 DISCUSSION

The major objectives of the two studies in the present research were to investigate internal vs external control expectancy among disadvantaged mothers, and examine its relationship to maternal behaviors, to their children's cognitive growth and to assess the effectiveness of participation in a parent education program in changing expectancies in an internal direction. Presumably if this change occurred improvement would also occur in the children's intellectual development.

Existing expectancies among the predominantly black indigent population sampled were found to be significantly more external than samples reported in the literature which included a wider social class range. Blacks were more external than whites although in Study II the difference was insufficient for the number in the sample to reach the conventional probability level. However, the difference was of the same magnitude and direction as those studies reported by Rotter (1966).

The importance of these findings is suggested by Lefcourt (1966) summarizing the arguments about social class, race, and expectancy. Individuals within the lower socioeconomic class, particularly blacks, early perceive impediments in the way of goal striving. For example, segregation and discrimination convey to blacks that their own efforts will lead to no reinforcements. Thus, they come to disbelieve that the efforts of an individual pay off.

This is not true for all disadvantaged people, as the inclusion of the I-E scores of Project Follow Through (modeled after Head Start) educators in the present studies demonstrated. Although from the same background of the indigent, volunteer mothers, they were significantly more internal. One can speculate on the variables which might explain this. The Follow Through educators were high school graduates, self selected by their alertness to the availability of a good job and staff selected for skills in relating and for apparent integrity. Thus, they had already received valuable reinforcements for their efforts, their skills, and their personal characteristics.

The results of the Follow Through educators are similar to those of Holmes as reported by Grotberg (1969). Holmes found differences among parents who referred their children themselves to Head Start as compared to those whose children were sought out by Head Start personnel. The self-referred group of parents were more like middle class parents in their higher aspirations for themselves and their children.

Three sets of maternal behaviors which seemed to reflect mastery of or attempts to improve upon mothering skills related to infant cognitive growth were selected for study: frequency of positive verbalizations, frequency of (presumably non-growth producing) negative verbalizations such as commands without rationale and baby talk, and frequency of behaviors presumed to show involvement with and commitment to a mothers' education program. No relationships were found to be reliable between maternal behaviors showing degree of involvement in the program as measured by the positive attitude index (PEP) and internal control expectancy. The results on positive and "negative"

verbal interaction seem equivocal in the two studies. However, consideration of the age differences between the two samples may help clarify this.

In the first study which involved infants 3 months to two years old, positive or potentially growth producing verbalizations such as explaining and describing things to the child by the mother were significantly related to internal expectancy and changes in that direction. Interestingly enough Gordon (1969) reports mothers who were more verbal on the same index had children who achieved more in the program. Still another study with much older children (pre-schoolers) by Hess and Shipman found "openness of mother to her child's questions" and "infrequency of imperative statements to child without rationale" were the best predictors of a child's achievement. Other good predictors which were related to I-E Control were the parents' aspirations (Grotberg, 1969).

In Study II which involved younger children (3-12 months) positive verbal interaction was not related to expectancy or expectancy changes. So called negative verbalizations were related to internal expectancy of mother measured when her infant was 3 months old, but not when he was one year old. Taken together the results from the two studies lead to the tentative conclusion that frequency of mother's verbal interaction with her child is related to internal control if the VI index is based on observation of verbalizations appropriate to the baby's age.

The inconsistencies discussed above also seem to involve methodological problems. What period of observation on mother should be related to what time at which her control expectancy is measured? In these

studies the observations were tabulated across the entire duration of the project while expectancy was measured at the beginning and the end. Thus, possible systematic variation of the two measures over time could not be assessed. Perhaps this could be overcome in a future study which used and compared several measurements of the two variables over time or one in which the VI measure was elaborated to give more information at different times.

That the positive attitude (PEP) index did not predict final expectancy or expectancy changes may also suggest that the behaviors selected reflected too much of a middle class bias, or that involvement in the project was not highly valued enough to influence the mothers' perceptions or reinforcement contingencies. Related to the former, the index was made up of such items as the number of delays and missed appointments a mother had which may not be relevant in an indigent population where many reality factors influence punctuality. Related to the latter, participation did seem to be valued enough to change expectancies in an internal direction at least in Study II.

Perhaps the weak relationship between the PEP index and I-E Control indicates an oversight of more potent variables. Rotter (1966) suggests in his discussion of the origin of I-E Control expectancies that these expectancies would be influenced by the actual reinforcement contingencies in an individual's life circumstances. In the case of the disadvantaged mothers studied these contingencies would seem to be the availability of time, funds, friends, etc., versus the amount of demands placed upon her. Thus, for example Freijo, Gordon and Bilker (1968) found that mothers in families supported by

income other than welfare were significantly more internal than families on welfare. This could be interpreted to mean greater availability of funds was related to internality. In addition, mothers in families where there was less illness observed were more internal than families in which there was more illness (Freijo, et al., 1968). This could be interpreted to mean that mothers less overwhelmed by demands were more internal.

There were no significant relationships between mothers' locus of control and children's achievement. Possibly these two variables are at the extremes of a chain of causal relationships. The intermediary links of the chain need to be investigated before the extremes lend themselves to greater predictability. Fruitful lines of research have already been mentioned. The question of whether parental behaviors influence achievement has been investigated in Head Start programs. For example, Hess and Shipman (in Grotberg, 1969) found that, although a few behaviors predicted children's achievement, for the most part parent behaviors were not found to predict children's achievement. On the other hand, some studies found parent participation predicted children's success in the program (Grotberg, 1969). The whole area of disadvantaged parental characteristics and their relationship to children's achievement is a wide open research territory.

Other important intermediary links would seem to be the relationship between locus of control among the children themselves and their achievement; between parental control expectancies and parental achievement; between parental achievement and children's achievement; and between parental control expectancy and children's control expectancy.

Ongoing research has already suggested some interesting answers to these questions. Freijo, et al. (1968), for example, found that whether or not a family was on welfare was related to mother's control expectancy. Welfare families were more external perhaps suggesting a relationship between achievement and expectancy. Stabler and Johnson found that compared to an external orientation, children who perceived events as internally controlled retained information longer (Grotberg, 1969). Thus, there seems to be a relationship between expectancy of I-E control and achievement within the same individual but interacting influences between parent and child, teacher and pupil are complex and as yet undetermined.

The most important conclusion of this research was that the relatively external expectancies of disadvantaged mothers were susceptible to change significantly in an internal direction. While this did not turn out to be true for the mothers in Study I there are factors allowing for giving less weight to that finding. That is, findings were contaminated by the lack of entry scores. No appropriate control group was available and the parent educators lacked the greater experience and confidence they showed subsequently when working with the new groups.

Perhaps the most worrisome characteristics of externally oriented persons is their failure-avoidant skill acquisition pattern. As Lefcourt and Ladwig (1965a) point out, this is particularly true of blacks in biracial, competitive achievement tasks. It seems that much of life in Black America involves just such tasks. Competition for achievement, a fact of current life, is particularly difficult for both blacks and whites in disadvantaged populations. If the disadvan-

taged continue to expect failure and withdraw from achievement situations, it will be difficult to break the poverty cycle. If other maladjusted persons feel powerless to improve their lives, community mental health cannot be improved. Thus, it is important to find a way of changing expectancies.

If one considers the significant change in the internality of the experimental mother's I-E Control as representing success in enhancing the volunteer mother's identification with the role of mother and child teacher, then the findings of Lefcourt and Ladwig (1965a) seem relevant here. When these authors were successful via prestige manipulations in creating identification with the role of jazz musicians among black prison inmates, the inmates persisted without failure-avoidance in a biracial competitive achievement task (in which failure was experimentally prearranged) much longer than inmates who weren't given this prestige manipulation. By analogy, one would expect the present sample (Study II) of participants to persist in enhancing and encouraging skills in themselves and their children even among the larger, biracial population longer than the control group of non-participants. It would be interesting to test this notion. Of even greater interest would be the strength and duration of this change in expectancy.

Although it remains to be investigated, the findings on changes in expectancy may generalize to other areas besides achievement and to other populations besides the lower socioeconomic class. For example, characteristics related to I-E Control seem important in psychotherapy. Knowledge of self, knowledge about one's present life situation and

motivation for improvement certainly are aims of psychological treatment. Research on expectancies of patients and their therapists would seem profitably extended to include I-E control expectancies.

Finally, a comment on the possible implications of the fact that mothers worked with by parent educators who made up their own program became the most internal. More research on characteristics of any person whose job it is to influence another person is needed. However, at present, the possibility that the greater self-regulation of the teacher lead to the more internal control expectancy should be of interest to educators, teacher educators, parents, therapists, or others involved in teaching and helping others.

CHAPTER 13 SUMMARY

Internal vs external control of reinforcements describes a generalized expectancy which determines to what extent certain outcomes of behavior will be categorized as within the individual's personal control and understanding. A person who tends to categorize events as internally controlled tends to expect that is is an individual's own characteristics and skills which influence what reinforcements he receives, in contrast to a person who categorizes events as externally controlled and tends to expect that chance, fate, powerful others or an incomprehensible complexity has the greater influence over the reinforcements a person receives.

The two studies reported here attempted (1) to validate theory and research indicating that the lower socioeconomic class individual tends to perceive events as externally controlled or perceives himself as alienated and powerless (to use related sociological terms); (2) to extend research findings on the relationship between improvement of one's life situation and internal I-E Control to the relationship between specific maternal behaviors and I-E Control; (3) to identify individual differences within the lower class on the dimension of I-E Control expectancy; (4) to examine the direct interrelationship between mothers' locus of control expectancy and children's achievement and (5) to extend previous research findings on correlations between

internal I-E Control and social action and affiliation to predict that participation in a social action program by lower class mothers would change their expectancies in an internal direction over time.

The mothers' I-E Control expectancy was assessed by a questionnaire originated by Rotter and others and found to have construct validity and reliability. The questions were revised for a fourth grade reading level. The revision was found to be a reliable one for an indigent population. Maternal behaviors were assessed by the observations made by indigenous non-professionals, the parent educators who made weekly visits to the subjects' homes. These were combined into three mothers' behavior indices: positive verbal interaction, negative verbal interaction, and involvement in the project. Infant achievement was assessed by progress on the program materials developed out of Piagetan theory and research, and by two standardized tests of infant achievement.

In Study I, the subjects were 65 indigent mothers and their infants (54 black and 11 white) who volunteered to participate in the Parent Education Project. Weekly observations were made by parent educators during mother training visits from the time the infant was 3 months old until he was 2 years old for one group of 21 mothers and until he was 1 year old for another group of 21 mothers. Mothers in both experimental groups were given a modified I-E Scale (called here SRI) when their infants were 6 months old and again when they were 2 years old. The 23 mothers and their infants used as controls were not visited weekly but were tested at the same intervals as the experimental mothers.

The major findings in Study I were:

1. Mothers were more external than samples not restricted to the lower class.

2. Mothers were more external than a sample of lower class, indigenous non-professionals.

3. Black mothers were more external than white mothers.

4. I-E scores did not correlate significantly with mothers' age and parity.

5. Mothers higher in positive verbal interaction (VI+) with their child were more internal.

6. Mother's education alone or in interaction with verbal level did not affect I-E Control scores.

7. Negative verbalizations (VI-) in mothers' interaction with their children were not related to mothers' locus of control.

8. There were suggestive but insignificant relationships between mothers' expectancy and children's achievement.

9. Mothers' degree of involvement in the project (PEP) was unrelated to expectancy changes.

10. Length of participation was not significantly related to expectancy changes.

A second study was planned to attempt to replicate the findings and to tighten up some of the procedures, in particular the possibly contaminated entry scores on the SRI and the unavailability of a non-participant control group. The basic plan and objectives of Study II were the same as the first study.

The sample consisted of three groups of indigent mothers and their infants: One group of 14 mothers who were visited weekly by the now experienced parent educators; another group of 14 visited by new parent educators who were former Head Start and nursery school workers who designed their own teaching program; and a control group of 26 who were assessed on maternal expectancy and infant achievement but not visited weekly for teaching and observation purposes.

The major findings were:

1. Mothers were more external than samples not restricted to the lower class.

2. Mothers were more external than a sample of indigenous non-professionals.

3. Black mothers were more external than whites of a magnitude similar to previous studies but not statistically significant for this N.

4. Mothers' I-E scores correlated insignificantly with age, parity, and education. A multiple correlation of the 3 variables with I-E Control Score was also non-significant.

5. The three maternal teaching behavior indices (VI+, VI-, PEP) were not related to initial or final control expectancy or expectancy changes, except that mothers higher in negative verbalizations (VI-) were more internal at the beginning of the project.

6. There were no significant interactions between each verbal index (positive and negative) and the project involvement index in their effect on I-E Control.

7. There were no significant interrelationships between children's achievement and mothers' control expectancy.

8. Participating mothers changed more in an internal direction than the control group of non-participating mothers at a .07 probability level.

9. The two groups of experimental mothers worked with weekly in the program were not significantly different in control expectancy or expectancy changes but the group worked with by educators who designed their own independent program were significantly more internal at the end of the project than the control group. The mothers taught by parent educators who used the program designed by the professional project staff were not significantly more internal and had not changed significantly more in an internal direction by the end of the project than the control group.

The most important reliable finding was the change in I-E Control among the experimental mothers in Study II. Mothers participating in a mother and infant education project became significantly more internal than a control group of non-participating mothers. The lack of cross validation of this finding in Study I was considered a function of methodological flaws in Study I.

When each of the two groups of experimental mothers in Study II was compared individually with the non-participant control group, one experimental group was significantly more internal than the controls while the other was not. The experimental group of mothers whose parent educators designed their own program were significantly more internal than control group mothers. This finding seemed to have implications for the effect of group discussion and group decision on commitment to social action.

Other stable findings in both studies were: (1) greater external I-E Control scores of disadvantaged mothers compared to scores of socially stratified populations reported by Rotter (1966), (2) greater external I-E scores of disadvantaged mothers compared to scores of indigenous non-professionals from the same ghetto area and (3) non-significant correlations between I-E Control and the subject's age, parity, or education.

Suggestions for future research were made on the basis of methodological and theoretical shortcomings of the present studies; e.g., the degree of internal consistency of the behavior indices, the appropriateness of the behavior indices to the class of the family and age of the infant in the mother-child interaction were considered important variables for designing future research. It was considered necessary to examine the relationships between mothers' expectancy and achievement, children's expectancy and achievement, and the effects of maternal behaviors and expectancy on children's expectancy of control, areas presently insufficiently researched, before examining further the relationships between maternal expectancy and children's achievement. The timing of the measures of the relevant parent and child variables was also discussed. The possibilities of using an instrument with a wider range of scores at the internal end, more reliable over time and more specific to the subjects situational context were considered. The duration of expectancy changes was considered an important question for future research.

Practical and heuristic implications of the findings were discussed, particularly the importance of changing failure avoidance among disad-

vantaged Negroes. The effectiveness of indigenous non-professionals who planned their own independent program in changing the relatively external expectancies of disadvantaged mothers in a more internal direction was also emphasized. This seemed to have important implications for ongoing social action programs such as Head Start, for present and future programs designed to educate parents and children, and for mental health programs. The possible generalizability of the findings to non-indigent populations was discussed.

Appendix A

Modified I-E Scale (SRI)

Name_____ Age____ Usual Job_____

School Grade Completed____ Number of Children____ Trainer_____

SOCIAL REACTION INVENTORY

Instructions

This is a questionnaire to find out the way in which certain events in our society affect different people. Each question has two choices, called a or b. Please choose the one of each pair (and only one) which you more strongly believe to be the case as far as you are concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief; obviously there are no right or wrong answers.

For each question, after I read both remarks to you, put a circle around a if you believe remark a more strongly; put a circle around b if you believe remark b more strongly. After each question tell me when you have made your choice. Then I will read the next one. Feel free to ask me to read any question over again. Be sure to print your name and other information asked for at the top of the page. Please do this now.

In some instances you may discover that you believe both remarks or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you are concerned. Also try to respond to one question at a time when making your choice; do not be influenced by your previous choices. REMEMBER, in each case, choose the remark which you personally believe to be more true.

I more Strongly Believe That:

1. a. Children get into trouble because their parents punish them too much.

   b. The trouble with most children (today)* is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.

   b. People's (troubles) result from the mistakes they make.

3. a. One of the (biggest) reasons why we have wars is because people don't take enough interest in (government).

   b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.

   b. (It is the sad truth that) an individual's worth often passes (without being recognized) no matter how hard he tries.

5. a. The idea that teachers are unfair to students is ("hot air").

   b. Most students don't realize (how much) their grades are influenced by (accident or chance).

6. a. Without the right breaks one cannot be a (good and able) leader.

   b. (Able) people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try, some people just don't like you.

   b. People who can't get others to like them don't understand how to get along with others.

8. a. (What a person is born with) plays the (biggest part) in determining (what they're like).

   b. It is one's experiences in life which determine what they're like.

* ( ) indicate a change from Rotter's I-E Scale

9. a. I have often found that what is going to happen will happen.

   b. (Putting trust in) fate has never turned out as well for me as making a (plan) to take a (certain) course of action.

10. a. In the case of the well prepared student there is (hardly ever) such a thing as an unfair test.

    b. Many times (test) questions tend to be so (different from class work) that studying is really a (waste of time).

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.

    b. Getting a good job depends mainly on being in the right place at the right time.

12. a. The average citizen can have an influence in Government (plans).

    b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.

    b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad (luck) anyhow.

14. a. There are certain people who are just no good.

    b. There is some good in everybody.

15. a. In my case, getting what I want has little or nothing to do with luck.

    b. Many times we might just as well decide what to do by (tossing) a coin.

16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.

    b. Getting people to do the right thing depends upon (being able), luck has little or nothing to do with it.

17. a. As far as world affairs are concerned, most of us are (pushed around) by forces we can neither understand, nor control.

    b. By taking an active part in (government) and social affairs the people can control world events.

18. a. Most people don't realize the (point) to which their lives are controlled by (accident and chance.)

    b. There is really no such thing as "luck".

19. a. One should always be willing to admit his mistakes.

    b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.

    b. How many friends you have depends upon how nice a person you are.

21. a. In the long run the bad things that happen to us are (made up for) by the good ones.

    b. Most (troubles) are the result of lack of (know-how, lack of knowledge, being lazy,) or all three.

22. a. With enough effort we can (clean up dirty government.)

    b. It is difficult for people to have much control over the things (government leaders) do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.

    b. (The harder) I study (the better grades) I get.

24. a. A good leader expects people to decide for themselves what they should do.

    b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.

    b. It is impossible for me to believe that chance of luck plays an important (part) in my life.

26. a. People are lonely because they don't try to be friendly.

    b. There's not much use in trying too hard to please people. If they like you, they like you.

27. a. There is too much (importance placed) on (team sports) in high school.

    b. Team sports are an excellent way to build character.

28. a. What happens to me is my own doing.

    b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why (government leaders) behave the way they do.

    b. In the long run the people are (at fault) for bad government on a national as well as on a local level.

Appendix B

Parent Educator Weekly Report (PEWR) and the teaching behavior indices (Index of Positive Verbal Interaction, Index of Negative Verbal Interaction, Index of Attitude Toward Parent Education Project) derived from it.

Weekly Report - Parent Educator Home Visit (PEWR)

Observer_____ Date Last Visit_____

Mother_____ Mother's Number_____

Date_____ Visit Number_____

Time in Minutes_____

Was this a TEST visit? Yes_____ No_____
If yes, which one? _____6 month, _____12 month,
_____18 month, _____24 month

CODE: 1. M=Mother, 2. F=Father, 3. S=Sibling (Brother and/or Sister), 4. GM=Grandmother, 5. A=Aunt, 6. BS=Baby sitter, 7. O=Other, 8. Nobody

1. People in the home:

A) With whom did you work? M F S GM A BS Other_____

B) Is this the person you usually work with in this home?

1. Yes_____ 2. No_____

C) Is this the person who cares for the baby most of the time? 1. Yes_____ 2. No_____

D) How many adults were present at least part of the time in the room in which you worked (besides the person with whom you worked)?_____

E) How many children were present at least part of the time in the room in which you worked (besides the baby)?_____

2. General Information:

A) How much activity was in the room in which you presented the exercises?

1. Nothing was going on besides the training_____
2. Other activities were going on but did not attract the attention of the baby_____
3. Other activities in the room often pulled the baby's attention away from the training_____
4. There was such a great deal of activity in the room that it made it difficult to present the exercises_____

Revised 2/21/68

3. Series Information:

A) How did the mothering one react to your instructions?
   1. Looked at you while you were talking, and/or asked questions_____
   2. Did other things while you were showing her how to do the exercise (examples of other things: straightened baby's clothes, looked around the room, did housework)_____
   3. Walked out of the room while you were explaining things to her_____
   4. Refused to do an exercise_____
   5. Laughed at and/or scoffed at instructions_____
   6. Other_____ What?_____

B) Mothering one's ability to repeat exercises:
   1. Could repeat exercises the trainer had explained to her_____
   2. Could do part of the exercise by herself but needed the trainer's help_____
   3. Couldn't repeat exercises the trainer had explained to her_____

C) What was the child's response to objects used?
   1. Did not look at or any way indicate interest in the objects_____
   2. Glanced at, and held objects briefly but did not explore them_____
   3. Played with materials when presented, but lost interest in them after a brief reaction_____
   4. Kept up interest in each item presented_____
   5. Didn't want to give up materials_____

D) When the mothering one goes over last week's exercises with her child she:
   1. Doesn't know what she's doing_____
   2. Knows what she's doing_____

E) When the mothering one goes over last week's exercises with her child she:
   1. Tries them on the child more than once if it doesn't go well the first time_____
   2. Gets discouraged or is satisfied after doing them once even if it doesn't go well the first time_____
   3. Does them more than once even if it goes very well the first time_____

F) How many interruptions were there during training that made the mothering one stop the exercise for a time?_____
   None_____, 1_____, 2_____, 3_____, 4_____, 5_____, More_____

G) What kinds of interruptions were there?
1. Mothering one had to care for another child
2. An adult wanted something
3. The phone rang
4. Visitors came
5. The baby had to be fed
6. The baby went to sleep
7. Other
8. None

H) What other types of activities were presented by the trainer to the mothering one?
1. Songs
2. Nursery Rhymes
3. Toy Making
4. Rhythm Games
5. Other What?
6. None

I) Check if you observed:
1. Homemade toys around the house
2. Mobiles hanging by baby's bed
3. Mothering one using songs or games you showed her
4. Other
5. None of the above

4. Baby's Health and Development:

A) Did the mothering one say the baby was sick?
1. She said the baby was sick
2. She said the baby was not sick
3. She did not say whether the baby was sick or not
If the mothering one said the baby was sick, explain:

B) Did you think the baby was sick?
1. Yes 2. No
Explain if you have a different idea than the mothering one:

C) What has the baby learned to do since you saw him last in addition to the series?
1. Rolls from side to side
2. Sits alone for a short time without support
3. Crawls (creeps on hands and knees)
4. Walks alone
5. Climbs on low chair
6. Runs or jumps
7. Climbs to a stand on chair
8. None of the above

D) How many clear words does the baby use?
1. Makes sounds, but no clear words
2. Babbles, but no clear words

3. 1 word_____
4. 2 or 3 words_____
5. 4 or 5 words_____
6. 6 to 9 words_____
7. 10 to 14 words_____
8. 15 to 20 words_____
9. More than 20 words_____

5. Social Information:

A) When the mothering one is in the room the child:
1. Watches her_____
2. Tries to get to her_____
3. Goes on as if mothering one wasn't in the room_____
4. Tries to get her attention_____
5. Other_____

B) When the mothering one comes near the child he:

1. Frowns_____
2. Watches her_____
3. Laughs_____
4. Cries_____
5. Smiles_____
6. Vocalizes_____
7. Reaches for her_____
8. Ignores her_____
9. Other___What?_____

6. Verbal Information:

A) To what extent do people talk to the baby?
1. No one talks to the baby_____
2. The one working with the baby talks to the baby about things with which they are working_____
3. The one working with the baby talks to the baby about things besides those with which they are working_____
4. People other than the one working with the baby talk to the baby_____

How people talk to or about the baby:	M	F	S	GM	A	BS	Other	Nobody
B) Who talks to the baby most of the time (more than half of the time)								
C) Look directly into his face								
D) Talk about him as though he were not there								
E) Talk sounds rather than words (example: coo, goo)								
F) Talk words rather than sounds								
G) Their tone of voice sounds cross and angry								

H) Their tone of voice sounds soft and loving

I) Use the baby's name (or nickname) when speaking to him

J) Repeat sounds the baby makes in a questioning way

K) Interpret to others what the baby says

L) Listen to the baby when the baby talks

M) In a few words, order or tell the baby to do or not to do things

N) Explain and describe things when talking to the baby

O) How many words are there in most of the sentences spoken to the baby by the mothering one?

0 1 2 3 4 5 6 7 8 9 _____

Give two sentences used by mothering one while talking to the baby_____

_____

_____

7. Missed Appointments and Delays:

A) Was the beginning of training delayed today?

Yes_____ No_____

B) If yes, why? Because the mothering one wanted to:

1. eat_____
2. feed the baby_____
3. do housework_____
4. dress the baby_____
5. get dressed herself_____
6. finish talking with friends or relatives_____
7. care for older children_____
8. let the baby sleep_____
9. Other_____

C) How many trips did you make before you got to see the mothering one for this visit?_____

If you made more than one visit answer the following:

D) Did the mothering one leave a message for you on any of the trips?

Yes_____ No_____

E) When you finally got to see the mothering one:

1. She said nothing about missing her appointments_____
2. She gave a confusing explanation_____
3. She gave an understandable explanation_____

Index of Positive Verbal Interaction

Pos. VI = $\frac{\text{tally of positive indicators}}{11.0 \times \text{no. of visits}}$

Items tallied if checked

1. 6 C
2. 6 F
3. 6 G
4. 6 I
5. 6 J
6. 6 K
7. 6 L
8. 6 N

6 O if sentence length 1 - 2 or 3 tally 1
4 - 5 or 6 tally 2
7 - 8 or 9 tally 3

Total possible tallies per PEWR = 11
Limits on index
0 pos. VI 1

Index of Negative Verbal Interaction

Neg. VI = $\frac{\text{tally of negative indicators}}{4 \times \text{no. of visits}}$

Items tallied negative if checked

1. 6 D
2. 6 E
3. 6 H
4. 6 M

Total possible tallies per PEWR = 4
Limits on index
0 neg. VI 1

Index of Attitude Toward Parent Educators Project

$$\text{Attitude Index} = \frac{(\text{Positive Tally} - \text{Negative Tally})}{(5.0 \times \text{No. of Visits})}$$

There are 5 possible tallies either positive or negative on the PEWR. A totally positive mother would score 5 positive tallies on every visit--with a resulting 0 negative tally. The calculated index for a totally positive mother would be +1.00. On the other hand, a totally negative mother would score 5 negative tallies, with resulting 0 positive tallies--thus her index would be -1.00. The resulting range of the index is:

-1.00 attitude index +1.00

Computation of Tallies:

If item 3A is scored 1 --- tally 1 positive

otherwise If item 3A is scored 3 --- tally 1 negative

otherwise If item 3A is scored 2 and item 3B is scored 1 or 2 --- tally 1 positive

otherwise If item 3A is scored 2 with item 3B scored 3 but item 3F is scored)1 and item 3G is not scored 6 --- tally 1 positive

otherwise ---------- tally 1 negative

This will result in 1 and only 1 tally--either positive or negative.

If item 3B is scored 1 or 2 --- tally 1 positive

otherwise If item 3B is scored 3 -------- tally 1 negative

If item 3D is scored 2 --- tally 1 positive

otherwise If item 3D is scored 1 --- tally 1 negative

If item 3E is scored 1 or 3 --- tally 1 positive

otherwise If item 3E is scored 2 -------- tally 1 negative

If item 7C is scored 1 --- tally 1 positive

otherwise If item 7C is scored 3 or more --- tally 1 negative

otherwise If item 7C is scored 2 and item 7D is scored yes or

If item 7C is scored 2 and item 7E is scored 3

--- tally 1 positive

otherwise --- tally 1 negative

Appendix C

Series Test

SAMPLES OF STIMULATION MATERIALS

SERIES I

POSITION

1. Baby's position: lying on his back on the floor, bed, crib or sofa.
2. Mother's position: kneeling at the side of the baby.

ACTION

1. When the baby makes any sound usable in speech, have mother tickle his tummy and smile. These sounds are not crying, fussing or noisy breathing.
2. Have mother repeat the sounds her baby makes.*

AIM

Baby responds by making similar sounds.

PURPOSE

To help the child communicate verbally with other people.

*Always encourage mother to use the baby's name when she talks to him.

SERIES IV

POSITION

Varied

ACTION

1. Point to and name parts of the baby's body, such as, arm, eye, nose, mouth, head, neck, ear, foot, toe, and hand.
2. Continue to name and explore pictures of objects in magazines and objects around the house with the baby.

AIM OF THE GAME

The baby vocally responds after you name the object.

PURPOSE

To give names to objects.

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BIOGRAPHICAL SKETCH

Larry M. Bilker was born in Brooklyn, New York, on April 16, 1940. He attended public schools in Brooklyn and upon his high school graduation entered Brooklyn College from which he received a B.A. degree in psychology in June, 1960. He entered the University of Florida graduate school in the Department of Psychology in September, 1963, and was awarded the degree of Master of Arts in April, 1966. Subsequently, he was a research associate for the Parent Education Project at the University of Florida. He is currently a staff psychologist at Bradley Hospital, Riverside, Rhode Island. He is also a consulting psychologist at the Providence School Clinic for Educationally and Emotionally Disadvantaged Children. His major professional interests are in child and community psychology and in family dynamics. He is a member of the Rhode Island Psychological Association.

Mr. Bilker's professional career has also included positions as a social worker for the New York Department of Welfare, a playground director for the New York Department of Parks, and a teacher of biology in the New York City high schools.

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This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Arts and Sciences and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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